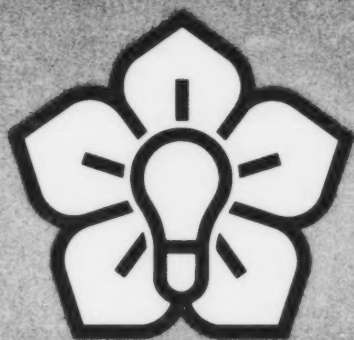




**Science Council  
of  
British Columbia**

**Thirteenth Annual Report  
1990-1991**



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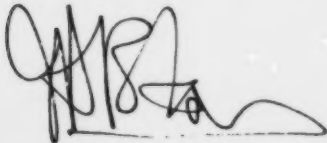
June 30, 1991

The Honourable Peter Dueck,  
Minister of Advanced Education, Training and Technology  
Province of British Columbia  
Parliament Buildings  
Victoria, B.C.  
V8V 1X4

Dear Minister Dueck:

I have the honour to present you the Thirteenth Annual Report of the  
Science Council of British Columbia for the year ending March 31, 1991.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Haig deB. Farris', with a long, sweeping horizontal stroke at the end.

Haig deB. Farris,  
Chairman,  
Science Council of British Columbia

***The Science Council of British Columbia is dedicated to identifying  
and encouraging opportunities for economic development in  
British Columbia through the promotion of creative applications  
of science and technology.***

# MEMBERS OF THE SCIENCE COUNCIL OF BRITISH COLUMBIA

CHAIRMAN



Mr. Haig deB. Farris

PRESIDENT



Dr. Tom W. Calvert



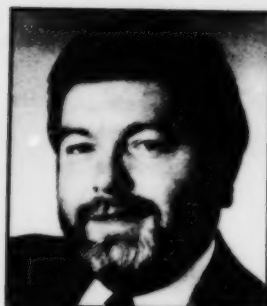
Dr. Christopher R. Barnes



Dr. Otto L. Forgacs



Ms. Gail S. Gabel



Dr. Brian W. J. Gillespie



Ms. Ellen Godfrey



Mr. Ian F. Greenwood



Dr. Colin H.W. Jones



Dr. Julia G. Levy



Dr. James A. McEwen



Dr. Keith V.S. Meyer



Dr. Robert C. Miller



Dr. L. Roy Queen



Dr. Ken A. Spencer



Dr. Brian W. Thair

## MEMBERS OF THE SCIENCE COUNCIL OF BRITISH COLUMBIA

*(List includes all those who served between April 1, 1990 and March 31, 1991)*

| Member                                                                                                             | Date of First Appointment            | Current Term Expires |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------|
| Mr. Haig deB. Farris<br>President<br>Fractal Capital Corporation<br>Vancouver                                      | October 20, 1988<br>(Chairman)       | October 1, 1991      |
| Dr. Tom W. Calvert<br>President<br>Science Council of British Columbia<br>Burnaby                                  | January 7, 1988                      | June 30, 1993        |
| Dr. Christopher R. Barnes<br>Director<br>Center for Earth and Ocean Research<br>University of Victoria<br>Victoria | November 16, 1990                    | September 1, 1993    |
| Dr. James A. McEwen<br>President<br>Andronic Devices Ltd.<br>Richmond                                              | September 18, 1986                   | September 1, 1991    |
| Dr. Otto L. Forgacs<br>Senior Vice-President<br>Research and Development<br>MacMillan Bloedel Ltd.<br>Vancouver    | October 20, 1988                     | October 1, 1988      |
| Ms. Gail S. Gabel<br>Managing Director and C.E.O.<br>Aanderaa Instruments Ltd.<br>Victoria                         | January 7, 1988<br>(Deputy Chairman) | September 1, 1992    |
| Dr. Brian W.J. Gillespie<br>Vice-President, Education<br>British Columbia Institute of Technology<br>Burnaby       | February 1, 1990                     | September 1, 1992    |
| Ms. Ellen Godfrey<br>President<br>Softwords/Press Porcépic<br>Victoria                                             | November 16, 1990                    | September 1, 1991    |

**Members (continued)**

| <b>Member</b>                                                                                                | <b>Date of First Appointment</b> | <b>Current Term Expires</b> |
|--------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|
| Mr. Ian F. Greenwood<br>Interior Regional Manager<br>British Columbia Research Corporation<br>Kelowna        | October 20, 1988                 | October 1, 1991             |
| Dr. Colin H.W. Jones<br>Dean, Faculty of Science<br>Simon Fraser University<br>Burnaby                       | November 16, 1990                | September 1, 1993           |
| Dr. Julia G. Levy<br>Vice-President, Research and Development<br>Quadra Logic Technologies Inc.<br>Vancouver | January 7, 1988                  | September 1, 1991           |
| Mr. Keith V.S. Meyer<br>General Manager<br>Cominco Metals Ltd.<br>Vancouver                                  | March 3, 1989                    | September 1, 1991           |
| Dr. Robert C. Miller<br>Vice-President, Research<br>University of British Columbia<br>Vancouver              | February 1, 1990                 | September 1, 1992           |
| Dr. L. Roy Queen<br>Clinical Orthodontist<br>Kamloops                                                        | February 1, 1990                 | September 1, 1992           |
| Dr. Ken A. Spencer<br>President<br>CREO Products Inc.<br>Burnaby                                             | February 1, 1990                 | September 1, 1990           |
| Dr. Brian W. Thair<br>Biology Professor<br>College of New Caledonia<br>Prince George                         | November 16, 1990                | September 1, 1993           |

## STAFF OF THE SCIENCE COUNCIL OF BRITISH COLUMBIA



Ms. Debbie Aubertin



Ms. Michelle Boyd



Dr. Max Cairns



Ms. Terri Chanyungco



Mr. Chris Crossfield



Ms. Clare Fodness



Ms. Karin Friedrich



Ms. Laura Jo Gunter



Ms. Lesley Lee



Ms. Cindy Lee



Ms. Dawn Livera



Mr. Vincent Lum



Ms. Tina Rasmussen



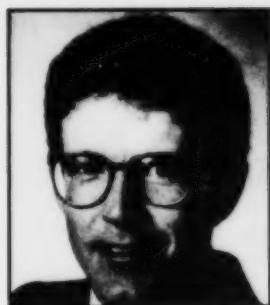
Ms. Deb Seibold



Ms. Linda Specht



Ms. Darlene Telnes



Mr. Rick Warner



Ms. Jennifer Wolfe

**SPARK CHAMPIONS AND CONSULTANTS TO THE  
SCIENCE COUNCIL OF BRITISH COLUMBIA**



Mr. Mike Boeur



Ms. Frances Lasser



Dr. Joseph Mueller



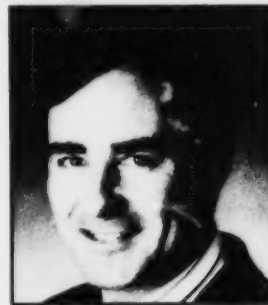
Dr. George Poling



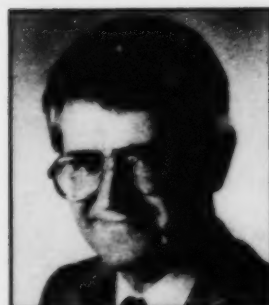
Mr. David Roberts



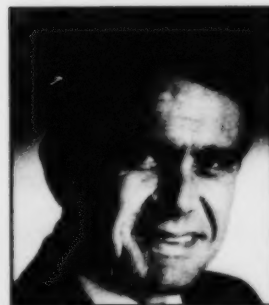
Mr. David Rodger



Mr. Arnold Smith



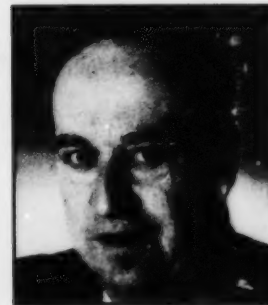
Dr. John Spence



Mr. Wolfgang Strigel



Mr. Alan Toon



Mr. Tom Turner

## SCIENCE COUNCIL OF BRITISH COLUMBIA STAFF

|                        |                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------|
| Dr. Tom Calvert        | President (from July 1, 1990)                                                              |
| Ms. Debbie Aubertin    | Receptionist/Secretary SPARK (from July 31, 1990)                                          |
| Ms. Adrienne Brown     | SPARK Receptionist/Secretary (to July 15, 1990)<br>Awards Secretary (to November 15, 1990) |
| Ms. Michelle Boyd      | Awards Secretary (from April 29, 1991)                                                     |
| Dr. Max Cairns         | Director of Programs                                                                       |
| Ms. Terri Chanyungco   | Awards Officer                                                                             |
| Ms. Lynda Clarke       | Finance and Administration Assistant (to May 25, 1990)                                     |
| Dr. Denis Connor       | President (to June 7, 1990)                                                                |
| Mr. Chris Crossfield   | Awards Officer (from February 1, 1991)                                                     |
| Ms. Clare Fodness      | SPARK Administrative Assistant (from March 20, 1991)                                       |
| Ms. Karin Friedrich    | Receptionist (from December 10, 1990)                                                      |
| Ms. Laura Jo Gunter    | Policy Coordinator                                                                         |
| Ms. Louise Lamb        | SPARK Administrative Assistant (to February 21, 1991)                                      |
| Ms. Cindy Lee          | Awards Secretary                                                                           |
| Ms. Lesley Lee         | Executive Assistant (from January 15, 1991)                                                |
| Ms. Dawn Livera        | Awards Officer                                                                             |
| Mr. Vincent Lum        | Awards Officer                                                                             |
| Ms. Pauline McKeever   | Executive Secretary (to November 9, 1990)                                                  |
| Ms. Janet Maennling    | Secretary (to February 15, 1991)                                                           |
| Ms. Tina Rasmussen     | Awards Secretary                                                                           |
| Ms. Valerie Rudelsheim | Receptionist (to October 12, 1990)                                                         |
| Ms. Deb Seibold        | Director of Finance and Administration                                                     |
| Ms. Linda Specht       | Financial & Administrative Assistant (from October 16, 1990)                               |
| Ms. Darlene Telnes     | Financial & Administrative Assistant (from May 23, 1990)                                   |
| Mr. Rick Warner        | Awards Manager                                                                             |
| Ms. Jennifer Wolfe     | Communications Coordinator                                                                 |

## **SPARK CHAMPIONS AND CONSULTANTS TO THE SCIENCE COUNCIL OF BRITISH COLUMBIA**

|                      |                                                                         |
|----------------------|-------------------------------------------------------------------------|
| Mr. Mike Boeur       | Public Events Coordinator (from January 2, 1990)                        |
| Dr. Laurence Evans   | SPARK Environment Champion (to March 31, 1991)                          |
| Mr. Ian Howard       | SPARK Overall Coordinator (to November 1, 1990)                         |
| Ms. Frances Lasser   | SPARK Health Industry Champion (from September 3, 1990)                 |
| Dr. ann lévi-lloyd   | SPARK Information Technologies Coordinator<br>(to September 1, 1991)    |
| Mr. Bob Martin       | SPARK Construction Coordinator (to August 30, 1990)                     |
| Dr. Joseph Mueller   | SPARK Biotechnology Coordinator (to April 30, 1991)                     |
| Dr. George Poling    | SPARK Mining Champion (to May 1, 1991)                                  |
| Mr. David Roberts    | SPARK Manufacturing Champion                                            |
| Mr. David Rodger     | Communications Manager                                                  |
| Mr. Arnold Smith     | SPARK Energy Champion (from February 18, 1991)                          |
| Dr. John Spence      | Director, B.C. Aquaculture Research and Development Council             |
| Mr. Wolfgang Strigel | SPARK Information Technologies Coordinator<br>(from September 11, 1990) |
| Mr. Alan Toon        | SPARK Construction Coordinator (from May 1, 1990)                       |
| Mr. Tom Turner       | Director of SPARK (from November 1, 1990)                               |
| Dr. Dick Whitney     | SPARK Health Sector Coordinator (to May 31, 1990)                       |

## FROM THE CHAIRMAN



In recent years the provincial government's interest in and commitment to science and technology has steadily grown. There is a growing awareness within government that knowledge properly managed and directed will create new industries while maintaining prosperity in our traditional resource industries.

The Science Council has played a central role in helping the government start to implement its vision of creating a science and technology culture throughout the Province. Our number one priority has been to increase grants to industry and academia to help create viable commercial products for B.C. companies. Our annual funding for this purpose from the government has increased from \$3.8 million five years ago to \$16.4 million for 1990/91. The number of projects funded jumped from 69 to 152 over that period.

Our second priority has been to develop the SPARK process to encourage the spread of technology and people expertise in all our industries. One of the most exciting aspects of SPARK is the power of the SPARK Steering Committee where all SPARK volunteer chairmen and the full-time staff "Champions" meet on a monthly basis to discuss common problems and assist each other in transferring technological opportunities and knowledge to all industry sectors.

Our third priority has been to increase public awareness of the important role individuals have in creating a science and technology based economy. To that end we created the Eve Savory Award for Science

Communication and the Cecil Green K.B.E. Award for Science Entrepreneurship.

Finally, we have started the process of involving all parts of B.C. in Science Council activities by carrying on an active outreach program. We are also helping regional groups form their own local science councils. Our SPARK committees have a regional mandate to ensure the rapid spread of technology in all industries and in all areas of the Province.

For the next year we plan to address ways to solve some of the many problems we face in developing a knowledge based economy. We will focus on ways to improve the management and marketing skills of our high tech industries. Our SPARK fiscal committee's recommendations cover some of these issues and we will work with the government to see these recommendations adopted.

We will continue to work closely with a variety of government departments and ministers to expand the role science and technology play in the development of our economy particularly in areas such as education, telecommunications and the environment. We believe that the percent of the provincial budget that is spent on all aspects of science and technology should be carefully studied and compared with other progressive jurisdictions. Science Council will focus attention on this issue in the coming years as we are convinced that science and technology issues should attract an increasing share of the provincial budget.

I would like to acknowledge and praise our 450 volunteers who spend hours working on Science Council and SPARK projects. Their dedication and skill along with that of our able President and his staff ensure a bright future for our Province. Our technology community is demonstrating an enviable sense of public service of which we can all be proud. I would also like to thank all the individual council members for their hours of volunteer service. The work is demanding, but the associations and friendships that develop and the sense of achievement we experience, I know, make it all worthwhile.

A handwritten signature in dark ink, appearing to read 'J. Haig deB. Farris', with a stylized flourish at the end.

J. Haig deB. Farris  
Chairman

## THE YEAR IN REVIEW

A new chairman.....

A new president.....

New members of the Science Council...

A new SPARK director and several new staff.....

New premises in Burnaby.....

...and the new Science and Technology Fund.

Indeed, the twelve months from April 1, 1990 to March 31, 1991 included much that was new for the Science Council of British Columbia. But it was also a time of consolidation, of coming to terms with the dramatic changes in responsibilities and activities that had begun several years earlier. After all, as recently as 1988, the Science Council had a budget of approximately four million dollars with which to operate its various programs in support of science and technology development in British Columbia. A scant three years later, at the end of the current fiscal year, the budget for grants, scholarships, fellowships and other activities and programs is almost \$20 million. The province's new Science and Technology Fund is a major reason why.

### SCIENCE AND TECHNOLOGY FUND

The provincial government proclaimed the establishment of the Science and Technology Fund in its April, 1990 budget. It dedicated the Fund to support five areas of significance to the province's science and technology community: Research and Development, Infrastructure, Human Resource Development, Public Awareness and Special Projects.

Opinion regarding the operation of the Science and Technology Fund was sought from the Science Council of British Columbia from the moment the Fund was established. Hundreds of people from within the Science Council's volunteer committees attended briefing sessions scheduled in June. These sessions were held in Victoria and Vancouver by the Ministry of Advanced Education, Training and Technology.

For a complete description of the results and

how the Fund is operating, please see the Ministry publication, *A Framework for Action*.

### CHANGES AT THE TOP

Dr. Denis Connor stayed true to his commitment to serve as the Council's first President for a two-year term. With his wife Della, he left on a year-long exploration of South America and Southeast Asia.

On July 1, 1990 he was succeeded by Dr. Tom Calvert, a member of the Science Council since early 1988. Dr. Calvert has taken an extended leave of absence from his faculty position at Simon Fraser



*Science Council President, Dr. Tom Calvert*

University. Until his appointment as President, he was the university's Vice President, Research and Information Systems.

In October, Mr. Haig deB. Farris was named the Science Council's sixth Chairman. Mr. Farris, a specialist in the financing of new technology-based ventures, is also well-known for his enthusiastic support of Science World, British Columbia's new science centre.

New members of the Science Council appointed during the year are Dr. Christopher Barnes, Director of the University of Victoria's Centre for Earth and Ocean Research, Ms. Ellen Godfrey, Presi-

## THE YEAR IN REVIEW (Continued)

dent of Softwords and Press Porcépic in Victoria, Dr. Colin Jones, Dean of Science at Simon Fraser University and Dr. Brian Thair, Professor with the Department of Biology at the College of New Caledonia in Prince George.

Those who retired included Dr. Eric Manning, Dean of Engineering at the University of Victoria, and Dr. John Spence, Executive Director of the British Columbia Aquaculture Research and Development Council.

### SCIENCE COUNCIL PROGRAMS

With support provided by the Ministry of Advanced Education, Training and Technology, through the Science and Technology Fund, the Science Council operates several major programs. One of these, the Health Development Fund, is operated jointly with the British Columbia Health Research Foundation.

In reviewing the achievements of each of these programs during the 1990-91 fiscal year, it is important to keep the Science Council's mission in mind. That mission is:

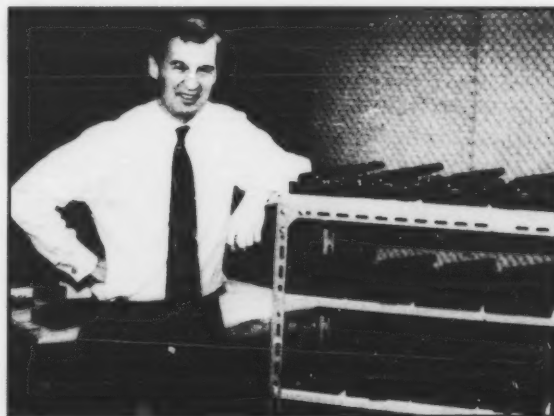
*to identify and promote opportunities for the sustainable economic development of British Columbia, by drawing upon the science and technology community for creative applications of innovative science and technology.*

The science and technology community provides thousands of hours of volunteer time each year, through service on the various peer review committees that evaluate the applications submitted to the Science Council.

### TECHNOLOGY B.C.

The largest program operated by the Science Council was known until recently as the Science and Technology Development Fund - Assistance Grants for Applied Research program (STDF-AGAR). This is an amalgamation of the Science Council's original AGAR program and the Ministry's STDF program created in 1988. To the relief of nearly everyone involved, the program was renamed Technology B.C. early in 1991.

The last two STDF-AGAR competitions were held in 1990. The first dealt with applications received by May 1, 1990, the results of which were announced by then Minister of Advanced Education, Training and Technology Bruce Strachan on September 5, 1990. Fifty four British Columbia com-



*Philip Scott of IVL Technologies in Victoria is using Technology B.C. support to develop "Whammy pedals" and other novel electronic musical equipment.*

panies and organizations shared approximately \$3.63 million in that competition. In late March, the Minister announced a further \$6.7 million in support of ninety-eight projects. Details of each project supported in the two competitions are published elsewhere in this report.



*Technology B.C. grant recipient, Dr. Kamlesh Patel of Agriforest Technologies in Kelowna, is developing tissue culture technology to produce superior quality Saskatoon Berry plants.*

## THE YEAR IN REVIEW (Continued)

A brochure entitled "Science Plus Technology Equals Success" provides profiles of a number of the projects supported by this program over the years, and is available from the Science Council office.

### HUMAN RESOURCES PROGRAMS

The Science Council's Human Resources programs have been designed to encourage young people to enter careers in science and engineering, and to assist those already working in those fields to upgrade their skills and knowledge.



*GREAT recipient, Mike van Ham of UBC, is looking at ways to recycle sewage sludge into forest fertilizer.*

The GREAT (Graduate Research, Engineering and Technology) program was created in 1978. To qualify for a GREAT scholarship a student in graduate studies at a British Columbia university must carry out his/her thesis research project in cooperation with an off-campus B.C. company, industrial organization or agency. Applications are reviewed once a year following the January 31st deadline.

Amendments to the GREAT program in 1990 will require the off-campus collaborators to show a direct contribution of at least \$2,000 to the student's project. The value of the scholarships has been raised to a maximum of \$16,000, depending

on what other scholarships a student may have secured.

Forty-eight GREAT scholarships were awarded in 1991. Details are published later in this report.

Another related scholarship is called STARS, **Science and Technology Awards for Returning Students**. To qualify, an applicant must have been working in industry for at least three years in a position relevant to his/her area of study at the time he/she makes an application. The application is to return to graduate research studies at a B.C. university. STARS scholarships are valued at \$25,000 per year. The rules governing them are similar to those for GREAT scholarships. Four STARS scholarships were awarded in the 1990-91 competition.

The **Industrial Post Doctoral Fellowships (IPDF)** are intended to encourage men and women who have recently been awarded Ph.D.'s in science and engineering to work in the private sector. The Science Council will pay \$25,000 a year, for up to two years, to B.C. companies hiring qualified people in positions appropriate to their skills and training. Nine Industrial Post Doctoral Fellowships were awarded in the fiscal year 1990-91.



*STARS recipient, Alex Sy is conducting research to help strengthen structural foundations against earthquakes.*

## THE YEAR IN REVIEW (Continued)



*IPDF recipient, Dr. Coreen Hamilton (left), conducting a dioxin analysis at Seakem Analytical Services in Sidney.*

The newest program within the Human Resources sphere is **TEST, the Training Employment in Science and Technology** program. Through the Science Council, the province provides funds to private sector employers for the employment and training of recent graduates of post-secondary programs in science, technology, engineering and related technical support. TEST-supported positions must provide full-time, ongoing employment. Employers who qualify will receive up to 60% of the wages paid to a qualified employee, up to a maximum of \$1,500 per month for a maximum of twelve months. TEST applications are considered throughout the year. In 1990-91 thirty-three TEST grants were awarded to thirty companies.

### OTHER PROGRAMS

**MART (Market Assessment of Research and Technology)** grants are awarded to qualifying researchers in universities, colleges, institutes or private companies to enable them to determine the market potential of research projects supported by the Technology B.C. and other programs. Twenty-seven MART grants worth up to \$20,000 each, were awarded in 1990-91.

The **Health Development Fund** is administered jointly by the B.C. Health Research Foundation and the Science Council. It provides grants for research and development that promise economic

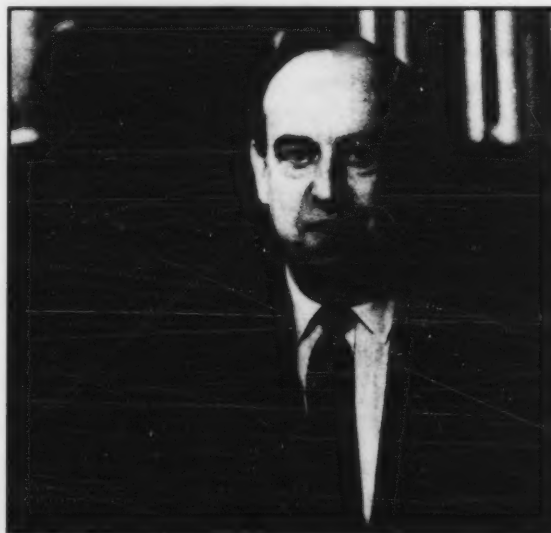
and health care benefits, based on new health technology.

In October, the Ministers of Health and Advanced Education, Training and Technology jointly announced that close to \$3 million in support from the Fund would be provided to fifty-five research projects in the province.

The Council is also administering approximately \$2 million in support of environmental research at the province's universities, on behalf of the Ministry of Environment.

### SPARK (STRATEGIC PLANNING FOR APPLIED RESEARCH AND KNOWLEDGE)

In the three years since it was created, SPARK has earned the admiration of science and technology communities across the country. SPARK brings together the leaders of British Columbia's major economic sectors, again in a volunteer capacity. They identify its prospects, look for opportunities for science and technology in the sector, and recommend measures which will ensure that the opportunities are realized.



*Mr. Tom Turner, SPARK Director*

## THE YEAR IN REVIEW (Continued)

Mr. Tom Turner, formerly of Industry, Science and Technology Canada, based in Vancouver, took over from Mr. Ian Howard as Director of SPARK in November, 1990.

Among the 1990-91 SPARK highlights, sector by sector, are the following:

### AGRICULTURE

Initial discussions regarding the possibility of a closer association between SPARK and the restructured Agriculture Research Council began late in the year with the provincial Ministry of Agriculture, Fisheries and Food. It is expected that this council will become the newest of the SPARK sector committees and will play a major role in developing a statement of research priorities for the various agencies involved in funding research and development activities within the province.

### ADVANCED INDUSTRIAL MATERIALS

Late in the fiscal year a group discussion was held to explore the possible establishment of a SPARK Advanced Industrial Materials (AIM) Committee. The consensus was that AIM is of sufficient importance to the province to warrant SPARK involvement. A full sector committee will become operational shortly with the initial support of the Manufacturing sector champion.

### AQUACULTURE

The B.C. Aquaculture Research and Development Council acts as the SPARK Committee in this important sector. In the past year the Council has concentrated on planning, funding and management of priority research projects on behalf of the major commercial sectors in B.C. aquaculture: salmon farming, oyster farming and clam farming. In conjunction with the industry, universities, colleges institutes and various other agencies a number of initiatives have been pursued in aquatic biotechnology, technology transfer and quality assurance programs. The Council has also raised funds to complete a business plan and a funding submission to create field research and test facilities to assist in the development of salmon farming in the province.

### BIOTECHNOLOGY

What the biotechnology industry appears to want is a focal point from which it can stimulate the exchange of ideas and information across this fast-growing and diverse field. A business plan was prepared for a Biotechnology Centre in this regard. Modifications to that plan were being considered at fiscal year end altering the Biotechnology Centre concept to that of a B.C. Biotechnology Alliance. The Alliance is expected to have more of an industry commitment than the originally planned Centre.

With regard to the industry overall, a comprehensive *Directory of B.C. Biotechnology Companies and Biotechnologists* was completed with over 700 copies distributed.

### CONSTRUCTION

Three major achievements highlight the year in the SPARK Construction Sector. Close to 160 people attended a seminar describing the opportunities for research and commercial development in "trenchless" technologies. These are new methods of laying, servicing or replacing the tunnels, conduit and raceways that lie under streets and buildings so that there is a minimum of disruption to the facilities involved.

A SPARK report on *Construction Waste Management* published in March described the scope of the problem of disposing of waste left at construction sites, and proposed a range of procedures, including entrepreneurial opportunities for improving the situation.

The Committee's crowning achievement was the establishment of a Chair in Computer Integrated Design and Construction at the University of British Columbia. A major pledge of \$400 thousand from the Real Estate Foundation of B.C. combined with other pledges will make the chair a focus of technological research and human resource development for the construction industry.

### ENERGY

The appointment of Mr. Arnold Smith as the Energy sector's first full-time champion has

## THE YEAR IN REVIEW (Continued)

prompted considerable increased activity here. The SPARK Energy Committee tabled a report by a task force on natural gas for vehicles. It described opportunities for British Columbia arising from increased use of natural gas as an alternative fuel in the transportation sector.

The committee sponsored a workshop on research, development and business opportunities in hydrogen technologies and systems. It highlighted the strengths and advantages British Columbia has as we move towards the vision of a hydrogen economy.

### ENVIRONMENT AND WASTE MANAGEMENT

The draft sector report "*Creating the Future: A Strategic Plan for the Environment Industry in B.C.*" was completed in the fall. It was presented to a public forum in October attended by over eighty people. The final report was released in January. A *Directory of the Environment Industry in B.C.* listing over 230 active companies was also completed. This project was supported by the National Research Council's Industrial Research Assistance Program.

Another project included preliminary meetings to discuss a possible environmental health initiative. The departure of sector champion, Dr. Laurence Evans, at the end of March slowed this initiative which is expected to be revived by his successor.

### FISCAL

This cross-sectoral committee investigated novel ways in which government could use its fiscal powers in a genuine partnership with the private sector. The SPARK Fiscal Committee pointed out, in its report issued in November, that a "prosperous base of high growth/high value-added industries requires more than just funds for investment in knowledge-based companies. There are three highly related and critical factors that must be operating to realize success. These are superior research talent, superior management talent and "knowledgeable" money.

Recommendations to government included tax breaks for people coming to the province to fill management vacancies in knowledge-based companies and direct loan assistance to knowledge-based companies to spread the burden of relocation and recruiting costs over a management settling period.

### FORESTRY

The Forestry Planning Committee, was relatively inactive during the year while major policy reviews were undertaken. With the conclusion and release of the report by the Forest Resources Commission, the continued need for a SPARK Forestry Sector Committee will be eliminated.

### HEALTH

The SPARK Health Sector Steering Committee is dedicated towards building a health technology industry in the province. To this end it undertook a number of initiatives in 1990-91, not least of which was the hiring of a new champion, Ms. Frances Lasser. She replaced Dr. Dick Whitney, who left to become the first Executive Director of the B.C. Health Research Foundation.

The Committee oversees working groups in medical devices, health informatics (the use of information technology in the health sector) and pharmaceuticals. A brief overview follows:

The Medical Devices working group began work on a commercialization handbook to help market and develop medical devices.

The Health Informatics working group is supporting the development of the Health Informatics '93 Congress and Exposition.

The Pharmaceutical working group prepared a pre-feasibility analysis of a Clinical Trials Umbrella Organization and began determination of feasibility for a university-industry liaison grants program.

Among other activities the SPARK Health sector made a submission to the Royal Commission on Health Care and Costs, developed a detailed strategy for the industry, and produced a comprehensive directory of the industry.

## THE YEAR IN REVIEW (Continued)

### INFORMATION TECHNOLOGIES

The major thrust of this committee has been to hasten the development of a Software Productivity Centre for British Columbia. A June forum, held simultaneously in Vancouver and Victoria and linked by interactive video, showed the high level of commitment to and interest in the proposed Centre from within the province's rapidly-growing software industry. Such a centre, when up and running, will enable the industry to improve its competitive position in both local and global markets.

A committee of senior industry representatives is working to develop a strategic plan to aid in long term decision making and to help identify growth barriers and solutions.

There is also a Human Resources Committee in this sector. It prepared a report that confirmed a current shortage of suitable staff in information technology generally, and predicted that the shortage will continue to grow if the industry develops at the same rate it has in recent years.

Mr. Wolfgang Strigel took over as Information Technologies Champion from Dr. Ann Lévi-Lloyd, now coordinating planning for the Softworld 91 conference to be held in Vancouver in September, 1991.

### MANUFACTURING

A new profile of British Columbia manufacturers emerged from a comprehensive survey undertaken by the SPARK Manufacturing Committee in the summer of 1990. It illustrated, among other things, that just over 20% of the manufacturers in this province consider themselves to be at the leading edge of production and technology and that many of them would welcome and support a B.C. Manufacturing Technology Centre.

In response to demand, this SPARK sector committee stages frequent workshops and forums. Among the most popular were ones on micro machines; how to secure funding for research and development; and computer-aided design and manufacturing. The funding workshop attracted

well over 200 people and plans have been made to stage it in Victoria and Kelowna in the near future.

### MINING

SPARK's objectives in this sector are being met through the Mining Association of British Columbia, where Dr. George Poling's position as Coordinator of Applied Research is supported in part by SPARK.

Among the highlights of this productive relationship has been an improved relationship between the mining industry and the universities. In particular, several new chairs in mining areas have been established at the University of British Columbia.

### AWARENESS

Every year, the Science Council carries out or supports activities that will increase awareness not only of its programs but of the importance of science and engineering in general. The B.C. Science and Engineering Awards are designed to meet



*Heather Taylor, an eighth grade student from Kelowna was one of forty students representing B.C. at the 1991 Canada Wide Science Fair last May in Vancouver.*

## THE YEAR IN REVIEW (Continued)

that objective. So, too, is the **Science Council Book Prize** that is awarded to the student achieving the highest marks in science in the graduating class of every participating high school in the province, private as well as public. This program is administered on behalf of the Council by the B.C. Science Teachers Association and the Federation of Independent Schools Association.

In a similar vein, the Science Council has been an enthusiastic supporter of the regional school science fairs in British Columbia and has contributed significant funds to ensure that the winners of the regional fairs are able to participate in the Canada Wide Science Fair each spring. Later, in cooperation with the Ministry of Advanced Education, Training and Technology, the Science Council invited all those who took part in the Canada Wide Science Fair in 1990 to attend the B.C. Science and Engineering Awards Dinner in October as guests of the Ministry and Council.

In another initiative launched in association with the Ministry, the Science Council helped create the new **Committee on Public Participation in Science and Technology** in 1990. Members of the committee have been appointed by various organizations, institutions and agencies with a specific mandate to communicate science and technological subjects in the schools and to the general public. The committee has assumed responsibility for planning the annual Science and Technology Week, has been instrumental in the establishment of the first regional science and technology council (in the Peace River region) and has established the Partners in Science Awareness Fund to provide funding support for community activities in science and technology awareness throughout the province.

Each year, the Science Council holds at least two of its regular monthly meetings outside the Lower Mainland. In April, 1990, the Council met in Kamloops, in September it travelled to Dawson Creek and Fort St. John, while in February, 1991, it held joint meetings with the Premier's Advisory Council on Science and Technology in Victoria.



*Science Council Outreach group in Dawson Creek. Left to right: Calvin Shantz, David Roberts, Laura Jo Gunter, Tom Calvert and Haig Farris*

These meetings have a two-fold purpose. On the one hand, they give members, through the tours and events scheduled for them in these communities, an opportunity to see and experience the level of science and technological activity underway in the communities. On the other, it gives the Council a chance to explain its programs where they may be less well known than in Greater Vancouver and the Lower Mainland. This, it hopes, will increase the distribution of grants, scholarships and fellowships and to allow it to develop programs and activities which will meet the needs of all parts of the province.

### BRITISH COLUMBIA SCIENCE AND ENGINEERING AWARDS

Since 1980, when Dr. Harold Copp was acclaimed the first winner, the British Columbia Science and Engineering Awards have been an integral part of the Science Council's awareness program. By recognizing excellence among the province's scientists and engineers, the Council highlights their achievements and creates role models for young people to emulate in their own careers.

A maximum of three gold medals may be awarded from among the nominations considered by the Awards Committee each year. In 1990, however, two new awards were presented. One, named

## THE YEAR IN REVIEW (Continued)



*Dr. Cecil Green, Entrepreneurial Science*

in honour of Dr. Cecil Green, a former resident of Vancouver and founder of Texas Instruments, celebrates the achievements of entrepreneurial scientists. The other, intended to recognize achievements in communicating science to the British Columbia public, is named for Eve Savory, a native of Duncan, B.C. and CBC Television's National Reporter on Science, Medicine and the Environment.

Both Dr. Green and Ms. Savory attended the 1990 B.C. Science and Engineering Awards Dinner to present the awards named for them. The Cecil Green Award for Entrepreneurial Science went to Dr. John MacDonald and Mr. Vern Dettwiler, founders of MacDonald Dettwiler and Associates, a Richmond-based company that has achieved world-wide success in the field of satellite imaging systems. Messrs. Mark Dickson and Roger Frampton of Victoria won the Eve Savory Award for Science Communication, in honour of the pub-



*Ms. Eve Savory, Science Communication*

lic presentations they staged at the Royal B.C. Museum during the Voyager spacecraft's encounter with Neptune in 1989.

Dr. William Unruh, a professor of physics at the University of British Columbia and Director of the Canadian Institute for Advanced Research's Cosmology program, won a gold medal in natural sciences for his pioneering work on quantum field theory applied to black holes.

In the Health Sciences category, Dr. David Dolphin won a gold medal for his research into a family of light sensitive chemicals called porphyrins, which is leading to a promising new cancer treatment. Dr. Dolphin is in the Department of Chemistry at the University of British Columbia. He is also Vice President of Technologies at Quadra Logic Technologies, the Vancouver firm that is leading the program of porphyrin development.

CBA Engineering Ltd. of Vancouver, Buckland Taylor of North Vancouver and the provincial Ministry of Transportation and Highways shared the gold medal in the Industrial Innovation. Together they designed and oversaw the construction of the innovative and spectacular Alex Fraser Bridge that spans the Fraser River near New Westminster.



*Winners left to right: Vern Dettwiler, Bridge Team: Bill Weir, Peter Brett, and Peter Taylor, John MacDonald, David Dolphin, William Unruh. Back row: Mark Dickson, Roger Frampton and Bruce Strachan.*

# SCIENCE COUNCIL OF B.C. -

Schedule of Science and Technology Development Fund (S.T.D.F.) - Assistance Grants for Applied Research (A.G.A.R.) Commitments for the year ended March 31, 1991

## 1. RESEARCH GRANT COMPETITION #3 (SA-3)

| GRANT RECIPIENT<br>& ORGANIZATION                                        | PROJECT DESCRIPTION                                                                                 | TOTAL \$<br>COMMITTED<br>1990-91 |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------|
| <b>A. AGRICULTURE &amp; FOOD</b>                                         |                                                                                                     |                                  |
| Ms. L. Edwards<br>B.C. Fruit Grower's Assoc.,<br>Kelowna                 | Development and Implementation of a Predator-<br>Based Program for Pear Pests                       | 45,000                           |
| Mr. K. Giles<br>Pitt Meadows Farms Ltd.,<br>B.K. Ranch Ltd.,<br>Richmond | Development of a Management Strategy to<br>Replace Chemical Insecticides in Cranberries             | 26,010                           |
| Dr. L. Gilkeson<br>Applied Bio-nomics Ltd.,<br>Sidney                    | Predatory Heteroptera for Biological Control of<br>Horticultural Pests                              | 31,384                           |
| Dr. S. Lau<br>Okanagan Federated Shippers,<br>Kelowna                    | Prediction and Non-Chemical Control of Apple<br>Scald                                               | 70,000                           |
| Dr. K.R. Patel<br>AgriForest Technologies Ltd.,<br>Kelowna               | Tissue Culture Technology for Commercial<br>Production of Fruit Trees                               | 44,000                           |
| Dr. H. Schreier<br>UBC, Soil Science                                     | Using Quantitative Remote Sensing and GIS<br>Techniques to Improve Cranberry Production             | 23,500                           |
| Dr. M.L. Winston<br>SFU, Biological Sciences                             | Development of Commercial Applications for<br>Honey Bee ( <i>Apis Mellifera</i> L.) Queen Pheromone | 45,000                           |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - *Continued*

### B. AQUATIC RESOURCES

|                                                                      |                                                                                                                                                                                            |        |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dr. R.M. Beames<br>UBC, Animal Science                               | Processing Fish Meal for Pacific Salmon                                                                                                                                                    | 46,876 |
| Mr. T.A. Broadley<br>IEC Collaborative Marine R & D Ltd.<br>Victoria | An Economic Assessment of Culturing the Manila Clam (Tapes Semidecussata) in B.C.                                                                                                          | 34,008 |
| Mr. G. Hadden<br>Fanny Bay Oysters Ltd.<br>Union Bay                 | An Evaluation of Shellfish Polyculture for More Cost Efficient Use of Foreshore                                                                                                            | 20,865 |
| Dr. G.K. Iwama<br>UBC, Animal Science                                | Development of Simple Field Methods for the Assessment of Stress and General Condition of Fish in Aquaculture Facilities; Second Stage: Field Testing at Commercial Aquaculture Facilities | 45,428 |
| Mr. G. Jones<br>Innovative Aquaculture Ltd.,<br>Lasqueti Island      | Development of Hatchery and Nursery Technology for the Purpose of Producing Low Cost Manila Clam (Tapes philippinarum) Seed                                                                | 50,000 |
| Dr. K.M. McErlane<br>UBC, Pharmaceutical Sciences                    | Determination of "Wash-Out" Times for Antibiotics and Their Tissue Distribution in Salmon                                                                                                  | 92,000 |
| Dr. R.J. Petrell<br>UBC, Bio-Resource Engineering                    | Non-Invasive Enumeration and Biomass Determination of Farmed Fish                                                                                                                          | 50,061 |
| Dr. R.G.B. Reid<br>UVic, Biology                                     | Manila Clam Seed Production Enhancement                                                                                                                                                    | 44,636 |
| Dr. J.R. Vielkind<br>B.C. Cancer Agency,<br>Vancouver                | Non-Destructive Method for Sex Determination in Salmonids                                                                                                                                  | 62,322 |
| Dr. R.A. Wall<br>UBC, Pharmacology                                   | Pharmacokinetics and Metabolism of Antibiotics in Salmonids                                                                                                                                | 36,993 |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - *Continued*

|                                                                  |                                                                 |        |
|------------------------------------------------------------------|-----------------------------------------------------------------|--------|
| Mr. B.M. Winsby<br>Salt Spring Aquafarms Ltd.,<br>West Vancouver | Evaluation of Sterilized (Triploid) Coho During<br>Cage Culture | 60,500 |
|------------------------------------------------------------------|-----------------------------------------------------------------|--------|

### C. BIOTECHNOLOGY

|                                                        |                                            |        |
|--------------------------------------------------------|--------------------------------------------|--------|
| Dr. P.E. Axelrood<br>B.C. Research Corp.,<br>Vancouver | Microbial Inoculants for Conifer Seedlings | 85,325 |
|--------------------------------------------------------|--------------------------------------------|--------|

|                                                   |                                              |        |
|---------------------------------------------------|----------------------------------------------|--------|
| Dr. D.G. Kilburn<br>UBC, Biotechnology Laboratory | High Intensity Batch Culture of Animal Cells | 83,188 |
|---------------------------------------------------|----------------------------------------------|--------|

|                                            |                                                                |        |
|--------------------------------------------|----------------------------------------------------------------|--------|
| Dr. W.R. McMaster<br>UBC, Medical Genetics | Photodynamic Killing of Metastasized Breast<br>Carcinoma Cells | 63,300 |
|--------------------------------------------|----------------------------------------------------------------|--------|

|                                                            |                                              |        |
|------------------------------------------------------------|----------------------------------------------|--------|
| Dr. R.D. Smith<br>Micrologix International Ltd.,<br>Sidney | Antibody-Based Diagnostic Test for H. Pylori | 77,438 |
|------------------------------------------------------------|----------------------------------------------|--------|

|                                                       |                                                     |         |
|-------------------------------------------------------|-----------------------------------------------------|---------|
| Dr. T.J. Trust<br>UVic, Biochemistry and Microbiology | DNA-Based Diagnostics for Salmonella<br>Enteritidis | 102,720 |
|-------------------------------------------------------|-----------------------------------------------------|---------|

### D. COMPUTERS & COMPUTING

|                                                                 |                                                                                |        |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|--------|
| Mr. W. Baker<br>Tetrad Computer Applications Ltd.,<br>Vancouver | Development of Desktop Demographics Software<br>with United States Census Data | 60,000 |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|--------|

|                                                             |                                                           |        |
|-------------------------------------------------------------|-----------------------------------------------------------|--------|
| Mr. P. Capozzi<br>Pan-Abode International Ltd.,<br>Richmond | Visually Based Home Designer and Pricing Expert<br>System | 84,000 |
|-------------------------------------------------------------|-----------------------------------------------------------|--------|

|                                                     |                                                     |        |
|-----------------------------------------------------|-----------------------------------------------------|--------|
| Mr. G. Casoli<br>Softek Services Ltd.,<br>Vancouver | A General Three Dimensional Steel Design<br>Program | 98,988 |
|-----------------------------------------------------|-----------------------------------------------------|--------|

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

|                                                                 |                                                                                                                                      |         |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------|
| Mr. K. Davies<br>Spitting Image Software,<br>New Westminster    | The Development of Color Print Drivers for<br>Outputting Files                                                                       | 23,200  |
| Dr. J.C. Dill<br>SFU, Engineering Science                       | Computer Aids in Analysis and Design of<br>Aesthetically Pleasing Geometric Shapes                                                   | 47,700  |
| Mr. R. Heron<br>HTS Hi-Tech Systems Ltd.,<br>Victoria           | Port of M400 Software to IBM System/370 VM and<br>AS/400 Platforms                                                                   | 137,486 |
| Dr. J. Jones<br>SFU, Engineering Science                        | Software for Intelligent Computer-Aided Design                                                                                       | 89,670  |
| Mr. P. Lacroix<br>Quester Tangent Corp.,<br>Sidney              | Development of a Software Product for the<br>Validation and Entry of Water Depth Data into<br>Geographic Information Data Bases      | 64,529  |
| Mr. D.Z. Lemkow<br>Digital Resource Systems Ltd.,<br>Nanaimo    | Continue the Enhancement of DRS's World-Class<br>Geographic Information Systems Product TerraSoft                                    | 104,620 |
| Mr. D.S. Rebak<br>Chancery Software Ltd.,<br>Vancouver          | Development of Tools and Utilities Initially, and<br>Subsequent Development of 'Multi Platform' and<br>'OS/2' Versions of Mac School | 80,000  |
| Mr. F. Wiese<br>ILS International Library Systems,<br>Vancouver | Image Database Management System                                                                                                     | 97,000  |

## E. ELECTRONICS & COMMUNICATIONS

|                                                      |                                                                       |         |
|------------------------------------------------------|-----------------------------------------------------------------------|---------|
| Mr. S. Adolph<br>TBT & Associates,<br>West Vancouver | Computer Generated and Controlled Voice for Taxi<br>Fleet Dispatching | 125,000 |
|------------------------------------------------------|-----------------------------------------------------------------------|---------|

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

|                                                                  |                                                                                                                               |         |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------|
| Mr. K.J. Cazakoff<br>Nexus Display Systems Corp.,<br>Burnaby     | Multimedia Controller and Video Display System                                                                                | 150,000 |
| Dr. V. Cuperman<br>SFU, Engineering Science                      | Rate-Adaptive Speech Codec with Error<br>Protection                                                                           | 43,560  |
| Mr. J. De Vaal<br>TIR Systems Ltd.,<br>Burnaby                   | Development of a Second Generation Light<br>Distribution System for Large Internally<br>Illuminated Signs                     | 40,120  |
| Mr. M. El Banna<br>Narrowband Telecom. Research Inc.,<br>Burnaby | Remote Satellite Data Terminal (Low Power<br>Frequency Synthesizer and Low Power Receiver<br>Low Noise Amplifier Development) | 20,000  |
| Mr. B.C. Gibson<br>IVL Technologies Ltd.,<br>Victoria            | Audio Multi-Effects Process for the Broadcast and<br>Recording Industries                                                     | 152,325 |
| Mr. D. Hobbs<br>Spectrum Signal Processing Inc.,<br>Burnaby      | Parallel DSP Processing System                                                                                                | 174,500 |
| Dr. S. Holdcroft<br>SFU, Chemistry                               | Electronically Conducting Polymers for<br>Photolithographic Applications                                                      | 35,000  |
| Dr. M. Parameswaran<br>SFU, Engineering Science                  | Micromachining of Silicon for Sensors and Actuator<br>Fabrication                                                             | 79,785  |
| Mr. D. Schebel<br>Infosat Telecommunications Ltd.,<br>Burnaby    | Development of a Satellite Communications<br>Controller and SCADA Applications                                                | 173,158 |
| Dr. B.G. Turrell<br>UBC, Physics                                 | Development of the Superheated<br>Superconductivity Granule Detector (SSGD)                                                   | 38,500  |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

### F. ENERGY

|                                                                   |                                                                                               |         |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------|
| Mr. R.J. Cullen<br>Cullen Detroit Diesel/Allison Ltd.,<br>Surrey  | Intensifier / Injector for Natural Gas Fueling of<br>Diesels                                  | 49,000  |
| Dr. S.P. Farthing<br>Wing'd Pump Associates,<br>Victoria          | Instrumentation of Manufacturing Prototype of the<br>Wingpump for Optimization and Monitoring | 36,500  |
| Dr. J.R. Grace<br>UBC, Chemical Engineering                       | A New Process for Natural Gas Reforming                                                       | 30,000  |
| Mr. S.W. Joseph<br>McCarney Technologies Inc.,<br>Vancouver       | An Expert System for the Diagnosis of Automobile<br>Engines with Computer Control System      | 169,000 |
| Mr. I.R. Radziejewski<br>Interlink Technologies Corp.,<br>Burnaby | Development of an Integrated Battery<br>Management System                                     | 45,000  |

### G. ENVIRONMENTAL TECHNOLOGY & WASTE MANAGEMENT

|                                                         |                                                                                                                           |         |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------|
| Mr. A. Gibb<br>B.C. Research Corp.,<br>Vancouver        | Optimization of Biological Phosphorus Removal<br>in a Combined Fixed and Suspended Growth<br>Wastewater Treatment Process | 142,885 |
| Mr. S.W. Houlding<br>Lynx Geosystems Inc.,<br>Vancouver | 3D Geotechnical Modeling System                                                                                           | 180,169 |
| Dr. J.P. Kimmins<br>UBC, Forest Sciences                | Recycling Urban Sewage Sludge and Other<br>Organic "Waste" as Slow-Release Forest<br>Fertilizer                           | 107,040 |
| Mr. E. Lee<br>B.C. Research Corp.,<br>Vancouver         | Development of a Sequential Anaerobic-Aerobic<br>Process for Dechlorination of Kraft Mill Effluent                        | 54,342  |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

### H. FOREST PRODUCTS

|                                                             |                                                                              |         |
|-------------------------------------------------------------|------------------------------------------------------------------------------|---------|
| Dr. J.D. Barrett<br>UBC, Harvesting & Wood Science          | Advanced Grading Technology for Structural Lumber                            | 113,179 |
| Dr. D.F. Leclerc<br>PAPRICAN,<br>Vancouver                  | On-Line Organic Chloride Sensor for Pulp Mill Effluents                      | 69,475  |
| Mr. A.W. Redekop<br>MacMillan Bloedel Research,<br>Burnaby  | Microwave/Vacuum Drying Technique for Lumber                                 | 65,630  |
| Dr. R.S. Seth<br>PAPRICAN,<br>Vancouver                     | Rapid, Simultaneous Measurement of Fibre Length, Deformation and Flexibility | 92,473  |
| Dr. J.K. Turnbull<br>MacMillan Bloedel Research,<br>Burnaby | Enhanced CTMP for High Performance Groundwood Printing Papers                | 149,340 |
| Dr. S.G. Withers<br>UBC, Chemistry                          | Environmentally Benign Control of the Fungal Degradation of Wood Products    | 97,863  |
| Mr. J. Aune<br>MacMillan Bloedel Research,<br>Burnaby       | Radio Frequency/Vacuum Drying of Lumber                                      | 24,840  |

### I. FORESTRY

|                                             |                                                                                                     |        |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------|--------|
| Dr. T.A. Black<br>UBC, Soil Science         | Effects of Mechanical Site Preparation Treatments on Seedling Microclimate, Frost Damage and Growth | 37,820 |
| Dr. J.H. Borden<br>SFU, Biological Sciences | Novel and Refined Semiochemical Treatments for Bark and Timber Beetles                              | 51,774 |

# 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

|                                                                                    |                                                                                                                                |        |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|
| Dr. F. Bunnell<br>UBC, Forest Sciences                                             | Projecting Indices of Competition by Salal                                                                                     | 8,966  |
| Dr. J.E. Carlson<br>UBC, Biotechnology Laboratory                                  | DNA Marker-Assisted Selection for Weevil Resistance in Spruce                                                                  | 97,935 |
| Dr. Y.A. El-Kassaby<br>Cdn. Pacific Forest Products Ltd.,<br>Saanichton            | Genetic Evaluation of Seed Crop Harvesting, Handling and Production Practices                                                  | 40,247 |
| Dr. M.C. Feller<br>UBC, Forestry Sciences                                          | Effects of Slashburning and Mechanical Site Preparation Treatments on Productivity of Englemann Spruce - Subalpine Fir Forests | 49,037 |
| Mr. B. Grainger<br>Brinkman & Associates<br>Reforestation Ltd.,<br>New Westminster | Motor-Manual Pruning Tool Development Project                                                                                  | 54,971 |
| Dr. C.D. Hawkins<br>MacMillan Bloedel Ltd.,<br>Nanaimo                             | SIVE: A Seedling Quality Test for All Phases of Forest Renewal (Nursery to Field)                                              | 58,800 |
| Mr. W.R. Hook<br>Precision Moisture Instrument Inc.,<br>Shawnigan Lake             | High Accuracy Soil Moisture Measurement: Automated Systems, Low Cost Field Unit                                                | 37,780 |
| Dr. K. Klinka<br>UBC, Forestry                                                     | Effects of Climate, Soil Water, and Soil Nutrients on Growth of Coastal Western Hemlock                                        | 31,400 |
| Dr. D.T. Lester<br>UBC, Forest Science                                             | Genetic Control of Wood Shrinkage, Fibril Angle, and Spiral Grain in Juvenile Wood of Douglas Fir                              | 17,600 |
| Dr. P.L. Marshall<br>UBC, Forest Resources Management                              | Development of Forest Mensuration and Biometrics Software                                                                      | 20,540 |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

|                                                           |                                                                                                |        |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Mr. B.G. Richards<br>Sky-Hook Systems Ltd.,<br>Vancouver  | Manufacturing and Testing of Prototype - Patented<br>Remotely Releasable Helicopter Cargo-Hook | 72,000 |
| Mr. B.J. Sauder<br>MacMillan Bloedel Research,<br>Burnaby | Transportation of Ambrosia Beetles in the<br>Industrial Milieu of Coastal British Columbia     | 60,780 |
| Dr. B.C.S. Sutton<br>B.C. Research Corp.,<br>Vancouver    | Molecular Genetic Analysis of Conifers for Seed<br>Orchard and Tree Improvement Planning       | 89,234 |
| Dr. P. von Aderkas<br>UVic, Biology                       | Artificial Seed of Western Larch                                                               | 36,000 |
| Dr. Y. Wand<br>UBC, Commerce & Business                   | Applications of Expert Systems Technology to<br>Forestry Site Preparation Decisions            | 37,097 |

### J. HEALTH TECHNOLOGY

|                                                               |                                                                |        |
|---------------------------------------------------------------|----------------------------------------------------------------|--------|
| Dr. G. Birch<br>Regenes Development Corp.,<br>North Vancouver | Development of an Advanced Prototype Remote<br>Gateway Product | 58,231 |
| Dr. S. Dost<br>UVic, Mechanical Engineering                   | Mechanical Prostheses for Vertebral Body<br>Replacements       | 30,700 |
| Mr. R. Evans<br>Datrend Systems Inc.,<br>Delta                | A Constant Current Electrostimulator                           | 46,793 |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - Continued

|                                                                        |                                                                                                           |        |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------|
| Dr. V. Hyrman<br>Electro Medical Technology Corp.,<br>Vancouver        | CompECT: Development of a Computer Based ECT<br>Instrument with EEG Feedback                              | 45,000 |
| Drs. J. Levy & A. Chan<br>Quadra Logic Technologies Inc.,<br>Vancouver | Photodynamic Therapy for AIDS: Extracorporeal<br>Inactivation of Human Immunodeficiency Virus in<br>Blood | 95,006 |
| Dr. S. Nakai<br>UBC, Food Science                                      | A New Homogenizing-Pasteurizer for Human Milk<br>Banking                                                  | 47,000 |

### K. MANUFACTURING & MACHINERY

|                                                                  |                                                                                  |        |
|------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|
| Dr. S. Cherry<br>UBC, Civil Engineering                          | Innovative Seismic Retrofit and Design of<br>Building and Equipment              | 70,712 |
| Dr. A.B. Dunwoody<br>UBC, Mechanical Engineering                 | Rudder Roll Reduction with an Adaptive<br>Autopilot                              | 17,200 |
| Dr. P.D. Lawrence<br>UBC, Electrical Engineering                 | Coordinated Control of Heavy Equipment                                           | 62,025 |
| Mr. I. McMillin<br>Dewey McMillin & Associates Ltd.,<br>Victoria | AIRBLAST - An Expert System to Provide the<br>Physical Properties of Blast Waves | 41,220 |
| Dr. A.D. Russell<br>CICON R & D Ltd.,<br>Vancouver               | Advanced Planning Tools for Large, Complex<br>Construction Projects              | 80,000 |
| Mr. G.A. Warner<br>Warner Shelter Corp.,<br>Surrey               | Advanced Technical Fabric Structure<br>Design/Manufacturing Centre               | 46,650 |
| Dr. J. Young<br>Teleflex Canada Ltd.,<br>Richmond                | Development of a Diesel Fired Vehicle Heater<br>System                           | 84,819 |

## 1. RESEARCH GRANT COMPETITION #3 (SA - 3) - *Continued*

### L. MINING, MINERALS & METALS

|                                                                     |                                                                      |        |
|---------------------------------------------------------------------|----------------------------------------------------------------------|--------|
| Dr. S.J. Juras<br>Westmin Resources Ltd.,<br>Vancouver              | Volcanic Massive Sulphide Deposits of B.C.                           | 76,000 |
| Mr. D.J. Murdock<br>Cominco Engineering Services Ltd.,<br>Vancouver | Process Control Improvements for Column Flotation                    | 41,877 |
| Dr. I.A. Paterson<br>Cominco Ltd.,<br>Vancouver                     | Precious Metal Mineralization, Iskut River Area<br>Northwestern B.C. | 98,250 |
| Dr. W. Spilsbury<br>Teck Corp.,<br>Vancouver                        | Copper-Gold Porphyry Systems of B.C.                                 | 95,000 |
| Ms. M. Windfeld<br>Clayburn Industries Ltd.,<br>Abbotsford          | Refractories for Smelting Magnesium                                  | 42,234 |

|                    |                                                    |                  |
|--------------------|----------------------------------------------------|------------------|
| M. AWARDS DECLINED | 2 Awards                                           | 197,624          |
|                    | (SA-3) Total \$ Committed 1990-91<br>(98 Projects) | <u>6,664,803</u> |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2)

| GRANT RECIPIENT<br>& ORGANIZATION                                | PROJECT DESCRIPTION                                                                                                                                                                               | TOTAL \$<br>COMMITTED<br>1990-91 |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>A. AGRICULTURE &amp; FOOD</b>                                 |                                                                                                                                                                                                   |                                  |
| Drs. R. Blair & B. Owen<br>UBC, Animal Science                   | Improved Productivity and Health Status of<br>Weanling Pigs by Enhancement of the Immune<br>System                                                                                                | 28,650                           |
| Dr. G.C. Boffey<br>Royal Inland Hospital,<br>Kamloops            | Isolation of the Paralysing Toxin Produced by the<br>Ixodid Tick, Dermacentor Andersoni Stiles, and to<br>Investigate the Feasibility of the Preparation of<br>an Anti-Paralysing Toxin Antiserum | 14,580                           |
| Dr. J.F. Chang<br>Phero Tech Inc.,<br>Delta                      | Commercialization of Sticky Colour Traps for Pest<br>Management and Trapping Enhancement with<br>Host Semiochemicals                                                                              | 51,465                           |
| Dr. N.L. Glass<br>UBC, Botany                                    | Use of Recombinant DNA to Develop a Detection<br>Assay for Fungal Plant Pathogens                                                                                                                 | 30,650                           |
| Dr. Z.K. Punja<br>SFU, Biological Sciences                       | The Etiology and Control of Cavity Spot on Fresh<br>Market Carrots in the Fraser Valley of B.C.                                                                                                   | 16,750                           |
| Dr. R. Rajamahendran<br>UBC, Animal Science                      | Biotechnological Manipulation of Bovine Embryos<br>to Optimize Embryo Transfer Technology                                                                                                         | 58,020                           |
| <b>B. AQUATIC RESOURCES</b>                                      |                                                                                                                                                                                                   |                                  |
| Dr. L.J. Albright<br>Silver Spring Aquaculture Corp.,<br>Burnaby | The Culture of Penned Sockeye Salmon                                                                                                                                                              | 40,070                           |
| Dr. A.T. Beckenbach<br>SFU, Biological Sciences                  | Genetic Diversity in B.C. Shellfish Stocks: The<br>Foundation for the Development of New Bivalve<br>Strains                                                                                       | 55,000                           |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - Continued

|                                                                   |                                                                 |         |
|-------------------------------------------------------------------|-----------------------------------------------------------------|---------|
| Dr. P.V. Fankboner<br>SFU, Biological Sciences                    | Pearl Culture in the Abalone Haliotis                           | 33,492  |
| Dr. D.O. Hodgins<br>SeaConsult Marine Research Ltd.,<br>Vancouver | Development of Advanced Radar Systems for<br>Ocean Measurements | 160,762 |
| Dr. W. Kay<br>Microtek R & D Ltd.,<br>Sidney                      | Dried Particle Vaccines in Aquaculture                          | 50,000  |
| Dr. B.A. McKeown<br>SFU, Biological Sciences                      | Compensatory Growth in Chinook Salmon and its<br>Application    | 43,640  |

### C. BIOTECHNOLOGY

|                                                         |                                                                                                                       |        |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------|
| Dr. C.P. Chanway<br>UBC, Forest Sciences                | Microbial Inoculation of Conifer Seedlings                                                                            | 67,651 |
| Mr. S.R. Smith<br>Canadian Lysozyme Inc.,<br>Abbotsford | Extraction and Development of Protease Inhibiting<br>Enzymes from Egg White for use in Under Utilized<br>Fish Sources | 52,515 |

### D. COMPUTERS & COMPUTING

|                                                                  |                                                                                                            |         |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------|
| Dr. D. Camporese<br>Techware Systems Corp.,<br>Richmond          | Application of Artificial Neural Network Models<br>to Process Control and Automation                       | 93,521  |
| Mr. C. Dewhurst<br>Capilano Computing Systems Ltd.,<br>Vancouver | Development of Methods for Automated<br>Interpretation and Conversion of Hardware<br>Description Languages | 24,696  |
| Mr. N. Koorland<br>OSIware Inc.,<br>Burnaby                      | 1988 CCITT X.400/MTA Product Development                                                                   | 152,500 |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - Continued

|                                                                |                                                                                         |         |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------|
| Dr. I. Morrison<br>Acquired Intelligence Inc.,<br>Victoria     | Re-Engineering and Enhancing a B.C.-Developed<br>Expert Systems Development Environment | 86,544  |
| Mr. M. Satterfield<br>Paradigm Development Corp.,<br>Vancouver | Database Publishing with Oracle Server and<br>Aldus PageMaker                           | 137,902 |
| Mr. P. Wolfe<br>Digital Dispatch Systems Inc.,<br>Richmond     | Application Developer's Tool Kit for Mobile Data<br>Industry                            | 136,000 |

### E. ELECTRONICS & COMMUNICATIONS

|                                                                              |                                                                                                                                  |         |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------|
| Mr. P. Berrang<br>Seastar Instruments Ltd.,<br>Sidney                        | Development of a Singlemode Fibre Optic<br>Connectorized Laser Diode                                                             | 48,645  |
| Drs. V.K. Bhargava & Q. Wang<br>UVic, Electrical and Computer<br>Engineering | Reliable Personal Wireless Communications                                                                                        | 76,300  |
| Mr. A. Carson<br>Carson Electronics,<br>Valemount                            | Computerized Automation for Small<br>Hydroelectric Systems                                                                       | 19,728  |
| Dr. N. Jaeger<br>UBC, Electrical Engineering                                 | Integrated Optics High Voltage Sensors                                                                                           | 81,500  |
| Mr. D.C. Liang<br>Aurora Instruments Ltd.,<br>Vancouver                      | Development of New Commercial Analytical<br>Instruments using Patented U.B.C. Technology of<br>Capacitively Coupled Plasma (CCP) | 130,520 |
| Mr. M.A. Lukas<br>Credit Systems International,<br>Burnaby                   | Remote Debit/Credit Card Terminal Development                                                                                    | 37,950  |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - *Continued*

### F. ENERGY

|                                                          |                                                                                |         |
|----------------------------------------------------------|--------------------------------------------------------------------------------|---------|
| Dr. I.S. Gartshore<br>UBC, Mechanical Engineering        | Numerical and Physical Modelling of Recovery<br>Furnaces                       | 65,000  |
| Dr. V.J. Modi<br>UBC, Mechanical Engineering             | Fuel Economy Through Aerodynamic Drag<br>Reduction of Truck/Bus Configurations | 108,500 |
| Dr. U. von Sacken<br>Moli Energy (1990) Ltd.,<br>Burnaby | A Study of Manganese Oxides for Lithium<br>Batteries Using EXAFS and XANES     | 54,700  |

### G. ENVIRONMENTAL TECHNOLOGY & WASTE MANAGEMENT

|                                                           |                                                                                                          |        |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------|
| Dr. D.S. Mavinic<br>UBC, Civil Engineering                | Enhanced Anaerobic Digestion of Mixed<br>Wastewater Sludges through Alkaline<br>Solubilization           | 66,020 |
| Dr. T.D. Vassos<br>NovaTec Consultants Inc.,<br>Vancouver | Development of Process Audit Technology for use<br>in Advanced Wastewater Treatment Plant<br>Application | 89,000 |

### H. FOREST PRODUCTS

|                                                                      |                                                                                                                                            |         |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Mr. P. Baker<br>Array Tech Systems Inc.,<br>Victoria                 | Array-Tag Readers for Material Tracking and<br>Inventory Control of Lumber                                                                 | 134,430 |
| Drs. R.M. Branion & K.V. Lo<br>UBC, Chemical Engineering             | Anaerobic/Aerobic Biological Treatment and<br>Foam Separation Treatment of TMP/CTMP<br>Pulpmill Wastewater for Toxicity and BOD<br>Removal | 51,800  |
| Drs. T. Eadie & T.M. Fyles<br>MacMillan Bloedel Research,<br>Burnaby | Integrated Peroxide Brightening Process Using<br>Membranes to Recover Residual Peroxide                                                    | 80,740  |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - *Continued*

|                                         |                                                                                         |        |
|-----------------------------------------|-----------------------------------------------------------------------------------------|--------|
| Mr. F. Sedun<br>Safer Ltd.,<br>Victoria | Field and Toxicological Evaluation of a New<br>Antisapstain Fungicide for Use on Lumber | 78,150 |
|-----------------------------------------|-----------------------------------------------------------------------------------------|--------|

### I. FORESTRY

|                                                    |                                                         |        |
|----------------------------------------------------|---------------------------------------------------------|--------|
| Dr. V.M. LeMay<br>UBC, Forest Resources Management | Development of a Dynamic Taper Model for Tree<br>Growth | 22,635 |
|----------------------------------------------------|---------------------------------------------------------|--------|

|                                                  |                                                                                                                  |        |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|
| Drs. N.J. Livingston & R.D. Guy<br>UVic, Biology | Stable Carbon Isotopes as Indicators of Increased<br>Water Use Efficiency and Productivity in Interior<br>Spruce | 59,200 |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|

|                                 |                                                                     |        |
|---------------------------------|---------------------------------------------------------------------|--------|
| Dr. J.N. Owens<br>UVic, Biology | Increased Cone and Seed Production in Yellow<br>Cedar Seed Orchards | 37,349 |
|---------------------------------|---------------------------------------------------------------------|--------|

|                                                    |                                                                                                                             |        |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------|
| Drs. G.F. Weetman & W.A. Thompson<br>UBC, Forestry | Predicting Growth Response to Fertilization for<br>Western Hemlock, Western Red Cedar and Sitka<br>Spruce on the B.C. Coast | 67,988 |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------|

### J. HEALTH TECHNOLOGY

|                                                                                          |                                                                                       |        |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
| Drs. M.N. Dance, G.F. Auchinleck<br>& J.A. McEwen<br>Andronic Devices Ltd.,<br>Vancouver | Development and Evaluation of Automated<br>Retraction Systems for Surgical Retraction | 90,000 |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|

|                                                                         |                                                                                             |        |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------|
| Mr. R.W. Evans & Dr. J. Smyth<br>B.C. Children's Hospital,<br>Vancouver | A Servo-Controlled Device for the Regulation of<br>Inspired Oxygen Concentration in Infants | 83,718 |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------|

|                                                                  |                                                                                 |        |
|------------------------------------------------------------------|---------------------------------------------------------------------------------|--------|
| Dr. T.L. Richardson<br>Richardson Industries,<br>North Vancouver | The Development of a Data Acquisition and<br>Analysis System for Brain Research | 52,500 |
|------------------------------------------------------------------|---------------------------------------------------------------------------------|--------|

|                                               |                                                            |        |
|-----------------------------------------------|------------------------------------------------------------|--------|
| Dr. F. Sassani<br>UBC, Mechanical Engineering | Computer Assisted Fabrication of Orthodontic<br>Appliances | 57,832 |
|-----------------------------------------------|------------------------------------------------------------|--------|

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - *Continued*

### K. MANUFACTURING & MACHINERY

|                                                                |                                                                                                       |         |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------|
| Dr. D. Berghofer<br>Dynapro Systems Inc.,<br>Vancouver         | PanelView Plus -- Expert System Software for<br>Industrially Hardened Shop-Floor Operator<br>Terminal | 80,000  |
| Dr. K. Colbow<br>SFU, Physics                                  | Laminated, Tin Oxide Coated Electrically Heated<br>Windows                                            | 39,680  |
| Dr. J.S. Collins<br>UVic, Electrical & Computer<br>Engineering | Initialization of Narrow Beam Acoustic Tracking<br>for Marine Robots                                  | 75,920  |
| Mr. D.D. Lemon<br>Arctic Sciences Ltd.,<br>Sidney              | Evaluation of Echo Sounder Correlation<br>Enhancement for Sidescan Sonar Applications                 | 24,136  |
| Mr. G.H. Shannon<br>Coast Yacht Design Inc.,<br>Surrey         | AutoSHIP Builder                                                                                      | 98,265  |
| Mr. G. Thorne<br>Conair Aviation Ltd.,<br>Abbotsford           | Continuous Flow Constant Flow Rate Fire<br>Suppressant Aerial Delivery System                         | 181,913 |

### L. MINING, MINERALS & METALS

|                                                                          |                                                                                            |        |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
| Mr. G. Cornwall<br>Range-Imaging Vision Systems Inc.,<br>North Vancouver | Range-Imaging System for the Underground<br>Mining Industry                                | 99,800 |
| Dr. W.K. Fletcher<br>UBC, Geological Sciences                            | Exploration Geochemistry of Platinum and<br>Associated Elements, Southern British Columbia | 23,325 |
| Dr. G. Toop<br>Cominco Ltd.,<br>Trail                                    | System for the On-Line Monitoring of Lead<br>Softening                                     | 18,500 |

## 2. RESEARCH GRANT COMPETITION #2 (SA-2) - *Continued*

|                                                            |                                            |        |
|------------------------------------------------------------|--------------------------------------------|--------|
| Mr. V. Uegama<br>Petrosul International Ltd.,<br>Vancouver | Enhancement of Wet-Forming Sulphur Process | 44,178 |
|------------------------------------------------------------|--------------------------------------------|--------|

|                    |         |        |
|--------------------|---------|--------|
| M. AWARDS DECLINED | 1 Award | 36,148 |
|--------------------|---------|--------|

|                                                    |                  |
|----------------------------------------------------|------------------|
| (SA-2) Total \$ Committed 1990-91<br>(54 Projects) | <u>3,650,538</u> |
|----------------------------------------------------|------------------|

# **INDUSTRIAL POST DOCTORAL FELLOWSHIPS (I.P.D.F.) AWARDED 1990-91**

## **1. NEW AWARDS**

| <b>Award Recipient</b>     | <b>Discipline<br/>Year of Graduation<br/>University</b>          | <b>Employing Company</b>            | <b>\$ Awarded</b>   |
|----------------------------|------------------------------------------------------------------|-------------------------------------|---------------------|
| Dr. H.F. Jang              | Physics<br>1989, McMaster U.                                     | PAPRICAN,<br>Vancouver              | 25,000              |
| Dr. M. Manness             | Elect Engineering<br>1989, U. of Glasgow                         | Devron-Hercules,<br>North Vancouver | 25,000              |
| Dr. D. Miller              | Entomology<br>1990, SFU                                          | Phero Tech Inc.,<br>Delta           | 25,000              |
| Dr. T. Yang                | Polymer Chemistry<br>1989, Polytechnical<br>University, Brooklyn | Ocutech Canada Inc.,<br>Langley     | 6,250               |
| Dr. Y. Zhang               | Physics<br>1990, SFU                                             | Intertech Systems Inc.,<br>Burnaby  | 25,000              |
| <b>Subtotal (5 awards)</b> |                                                                  |                                     | <hr/> 106,250 <hr/> |

## **2. RENEWAL AWARDS**

| <b>Award Recipient</b> | <b>Discipline<br/>Year of Graduation<br/>University</b> | <b>Employing Company</b>                           | <b>\$ Awarded</b> |
|------------------------|---------------------------------------------------------|----------------------------------------------------|-------------------|
| Dr. A.P. Hornby        | Pathology<br>1989, UBC                                  | JR Laboratories Inc.,<br>Burnaby                   | 25,000            |
| Dr. S. Marandi         | Space Dynamics<br>1988, UBC                             | MacDonald Dettwiler<br>and Associates,<br>Richmond | 25,000            |
| Dr. W. G. McMullan     | Physics/Math<br>1981, SFU                               | SF Univentures,<br>Burnaby                         | 25,000            |

## 2. RENEWAL AWARDS - *Continued*

|                     |                                  |                                                  |                |
|---------------------|----------------------------------|--------------------------------------------------|----------------|
| Dr. R. Thies        | Pharmacology<br>1987, U. of Iowa | Canadian Liposome<br>Company,<br>North Vancouver | 25,000         |
|                     |                                  |                                                  | <hr/>          |
| Subtotal (4 awards) |                                  |                                                  | 100,000        |
|                     |                                  |                                                  | <hr/>          |
| Total (9 awards)    |                                  |                                                  | <u>206,250</u> |

## GRADUATE RESEARCH, ENGINEERING AND TECHNOLOGY (G.R.E.A.T.) SCHOLARSHIPS AWARDED 1990-91

### 1. NEW AWARDS (COMPETITION GC-10)

| Name of Student  | University & Department                                      | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                            | \$ Value |
|------------------|--------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------|----------|
| D. Atagi         | UBC, Forest Science, Zoology, and Westwater Resource Ecology | T.G. Northcote                    | MacMillan Bloedel Limited, Nanaimo                                | 14,000   |
| S.C. Blundell    | SFU, Biological Sciences                                     | L.J. Albright                     | Microtek R & D Ltd., Sidney                                       | 14,000   |
| C. Bradley       | UVic, Mechanical Engineering                                 | G.W. Vickers                      | Comptec International Ltd., Surrey                                | 14,000   |
| R.N. Braithwaite | UBC, Electrical Engineering                                  | M.P. Beddoes                      | International Submarine Engineering Research Ltd., Port Coquitlam | 5,000    |
| G. Brown         | UBC, Forest Sciences and Biotech. Laboratory                 | J.E. Carlson                      | Canadian Pacific Forest Products, Saanichton                      | 14,000   |
| F. Bussani       | UBC, Mechanical Engineering                                  | C.W. de Silva                     | British Columbia Packers Ltd., Richmond                           | 14,000   |
| R. Cam           | UBC, Electrical Engineering                                  | C. Leung                          | Microtel Pacific Research (MPR) Ltd., Burnaby                     | 14,000   |
| M. Carver        | UBC, Forest Sciences                                         | J.P. Kimmins                      | Greater Vancouver Regional District, Burnaby                      | 6,666    |
| A.C. Chakrabarti | UBC, Biochemistry                                            | P.R. Cullis                       | The Canadian Liposome Co., North Vancouver                        | 14,000   |
| A. Chonn         | UBC, Biochemistry                                            | P.R. Cullis                       | The Canadian Liposome Co., North Vancouver                        | 14,000   |
| G. Clarke        | UBC, Physics                                                 | R. Parsons                        | Pacific Microelectronics Centre, Burnaby                          | 14,000   |
| P.M. Curry       | UBC, Microbiology                                            | J.G. Levy                         | Quadra Logic Technologies, Inc., Vancouver                        | 6,000    |
| G.L. Dawson      | UBC, Geological Sciences                                     | C. Godwin                         | Corona Corporation, Vancouver                                     | 14,000   |

# 1. NEW AWARDS (COMPETITION GC-10) - Continued

| Name of Student | University & Department             | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                                                                     | \$ Value |
|-----------------|-------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| M. Dehn         | SFU, Biological Sciences            | L.M. Dill                         | Creston Valley Wildlife Management Area, Creston                                                           | 14,000   |
| C. Delong       | UBC, Geological Sciences            | C.I. Godwin                       | Continental Gold Corp., Vancouver                                                                          | 14,000   |
| D.R. Devlin     | SFU, Biological Sciences            | J.H. Borden                       | 1) Phero Tech Inc. ,<br>Delta<br>2) B.C. Forest Service,<br>Victoria                                       | 14,000   |
| M. Erlic        | UVic, Electrical and Computer Eng.  | W.S. Lu                           | International Submarine Eng., Port Coquitlam                                                               | 14,000   |
| L. Fukumoto     | UBC, Food Sciences                  | S. Nakai                          | Dairyland Foods, Burnaby                                                                                   | 6,667    |
| R.A. Garduno    | UVic, Biochemistry and Microbiology | W.W. Kay                          | Microtek R & D Ltd., Sidney                                                                                | 14,000   |
| D. Hare         | SFU, Mathematics and Statistics     | B.R. Alspach                      | Glen Cooper and Associates Ltd., Vancouver                                                                 | 14,000   |
| A. Ingraham     | SFU, Biological Sciences            | J.M. Webster                      | 1) B.C. Cranberry Growers Association,<br>Richmond<br>2) Agriculture Canada, Entomology Section, Vancouver | 14,000   |
| J.C. Josafatow  | UBC, Mechanical Engineering         | M. Salcudean & I. Gartshore       | Weyerhaeuser Canada Ltd., Kamloops                                                                         | 5,100    |
| B.C. Kingzett   | SFU, Biological Sciences            | E.B. Hartwick                     | Canadian Benthic Ltd., Bamfield                                                                            | 14,000   |
| M. Kurz         | SFU, Biological Sciences            | W. Vidaver                        | B.C. Research Corporation, Vancouver                                                                       | 14,000   |
| G. Marquis      | UVic, Physics and Astronomy         | G. Spence                         | Pacific Geoscience Centre, Sidney                                                                          | 14,000   |
| A.S. Massoumi   | UBC, Electrical Engineering         | S. Kallel                         | Mobile Data International Inc., Richmond                                                                   | 14,000   |

# 1. NEW AWARDS (COMPETITION GC-10) - Continued

| Name of Student | University & Department                   | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                                                               | \$ Value |
|-----------------|-------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------|----------|
| M. McGuire      | SFU, Engineering Science                  | D. Ingraham                       | 1) Vancouver Adapted Music Society ,<br>Vancouver<br>2) J.D. Koftinoff Software Ltd.,<br>Grand Forks | 14,000   |
| J. McLeod       | UVic, Biochemistry and Microbiology       | S. Misra                          | Canadian Pacific Forest Products Ltd.,<br>Saanichton                                                 | 14,000   |
| D. Menemenlis   | UVic, Electrical and Computer Engineering | A. Zielinski                      | Institute of Ocean Sciences,<br>Sidney                                                               | 10,780   |
| J. Morgan       | UBC, Forest Sciences                      | F. Bunnell                        | Fletcher Challenge Canada Ltd.,<br>Crofton                                                           | 14,000   |
| D.K. Mumford    | UBC, Mechanical Engineering               | A.B. Dunwoody                     | Sea-Link Marine Services Ltd.,<br>Vancouver                                                          | 14,000   |
| M.J. Neumann    | UBC, Forest Sciences                      | B. van der Kamp                   | B.C. Research Corporation,<br>Vancouver                                                              | 14,000   |
| C. Powell       | UBC, Electrical Engineering               | V.C.M. Leung                      | Microtel Pacific Research Ltd.,<br>Burnaby                                                           | 14,000   |
| J.C. Quinton    | SFU, Biological Sciences                  | B.A. McKeown                      | Royal Harvest Aquaculture Ltd.,<br>Sechelt                                                           | 14,000   |
| D.R. Rusch      | UBC, Forest Sciences                      | B.J. van der Kamp                 | B.C. Research Corporation,<br>Vancouver                                                              | 14,000   |
| P.D. Schuler    | SFU, Engineering Science                  | V. Cuperman &<br>R.H.S. Hardy     | Microtel Pacific Research Ltd.,<br>Burnaby                                                           | 6,000    |
| T. Shannon      | UBC, Harvesting and Wood Science          | J.D. Nelson                       | MacMillan Bloedel Research,<br>Burnaby                                                               | 14,000   |
| S. Skaalid      | UVic, Biology                             | J.N. Owens                        | Pacific Forestry Centre,<br>Victoria                                                                 | 14,000   |
| C.R. Teerling   | SFU, Biological Engineering               | J.H. Borden                       | 1) Phero Tech Inc.,<br>Delta<br>2) Western Greenhouse Vegetable Research Council,<br>Surrey          | 4,000    |

# 1. NEW AWARDS (COMPETITION GC-10) - Continued

| Name of Student      | University & Department     | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                                          | \$ Value |
|----------------------|-----------------------------|-----------------------------------|---------------------------------------------------------------------------------|----------|
| D. Tse               | UBC, Mechanical Engineering | M. Salcudean & I. Gartshore       | Weyerhaeuser Canada Ltd., Kamloops                                              | 5,100    |
| E. Urquhart          | SFU, Biological Sciences    | Z.K. Punja                        | B.C. Greenhouse Vegetable Research Council, Surrey                              | 14,000   |
| M. van Ham           | UBC, Forest Sciences        | J.P. Kimmins                      | Greater Vancouver Regional District, Burnaby                                    | 14,000   |
| R. Van Meel          | UBC, Plant Sciences         | J.H. Myers                        | B.C. Blueberry Development Council, Victoria                                    | 14,000   |
| W. Warner            | UBC, Electrical Engineering | C. Leung                          | Mobile Data International, Richmond                                             | 11,500   |
| K.J. White           | SFU, Biological Sciences    | J.H. Borden                       | 1) Phero Tech Inc., Delta<br>2) Agriculture Canada Research Station, Summerland | 14,000   |
| R. Wielgus           | UBC, Forest Sciences        | F. Bunnell                        | 1) Darkwoods Forestry, Nelson,<br>2) Crestbrook Forest Industries, Cranbrook    | 14,000   |
| P.B. Willaimson      | UBC, Mechanical Engineering | S.M. Calisal                      | B.C. Research Corporation, Vancouver                                            | 6,000    |
| Y. Yin               | SFU, Geography              | T.K. Poiker                       | Neural Systems Inc., Vancouver                                                  | 14,000   |
| Subtotal (48 awards) |                             |                                   |                                                                                 | 600,813  |

## 2. RENEWAL AWARD - Year 2 (Competition GC-10)

| Name of Student | University & Department                      | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                                                            | \$ Value |
|-----------------|----------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------|----------|
| G.T. Byford     | UBC, Forest Sciences                         | J.A. McLean                       | Ministry of Forests, Smithers                                                                     | 14,000   |
| M.D. Calder     | UBC, Animal Sciences                         | R. Rajamahendran                  | Helix Biotech Corporation, Richmond                                                               | 14,000   |
| G. Corley-Smith | SFU, Biological Sciences                     | B.A. McKeown                      | 1) Salt Spring Aquafarms Ltd., West Vancouver<br>2) Fish Culture Research Section, West Vancouver | 14,000   |
| M. Davenport    | UBC, Physics and Microbiology                | G.W. Hoffmann                     | Microtel Pacific Research Ltd., Burnaby                                                           | 4,400    |
| S.A. Dehler     | UBC, Geophysics and Astronomy                | R.M. Clowes                       | 1) Geological Survey of Canada, Sidney<br>2) Shell Canada, Calgary                                | 14,000   |
| D. Dilorio      | UVic, Physics and Astronomy                  | R.W. Stewart                      | Institute of Ocean Sciences, Sidney                                                               | 4,400    |
| B. Flinn        | UBC, Botany                                  | I.E.P. Taylor                     | B.C. Research Corporation, Vancouver                                                              | 14,000   |
| J.C. Glaubitz   | UBC, Forest Sciences and Biotech. Laboratory | J.E. Carlson                      | Canadian Pacific Forest Products Limited, Saanichton                                              | 14,000   |
| D.W.C. Hunt     | UBC, Microbiology                            | J. Levy                           | Quadra Logic Technologies Inc., Vancouver                                                         | 14,000   |
| J. Hunt         | UBC, Geological Sciences                     | R.M. Bustin                       | Geological Survey of Canada, Vancouver                                                            | 8,667    |
| M.W. Hutzinger  | SFU, Chemistry                               | A.C. Oehlschlager                 | Phero Tech Inc., Delta                                                                            | 14,000   |
| C. Jamieson     | UBC, Microbiology                            | J. Levy                           | Quadra Logic Technologies Inc., Vancouver                                                         | 14,000   |
| B.F. Lehmann    | UBC, Mechanical Engineering                  | S.G. Hutton                       | 1) MacMillan Bloedel Research, Burnaby<br>2) CAE Machinery Ltd., Vancouver                        | 14,000   |

## 2. RENEWAL AWARD - Year 2 (Competition GC-10) - Continued

| Name of Student   | University & Department                  | Name(s) of Academic Supervisor(s)  | Name(s) of Cooperating Organization(s)             | \$ Value |
|-------------------|------------------------------------------|------------------------------------|----------------------------------------------------|----------|
| H.A. Leitch       | UBC, Microbiology                        | J. Levy                            | Quadra Logic Technologies Inc.,<br>Vancouver       | 14,000   |
| D.T. Lowery       | UBC, Plant Sciences                      | M.B. Isman                         | Safer Limited,<br>Victoria                         | 4,400    |
| C. Messier        | UBC, Forest Sciences                     | J.P. Kimmins                       | Western Forest Products Ltd.,<br>Vancouver         | 14,000   |
| M. Namchuk        | UBC, Chemistry                           | S.G. Withers                       | Forintek Canada Corporation,<br>Vancouver          | 14,000   |
| K. Naumann        | SFU, Biological Sciences                 | M.L. Winston                       | Phero Tech Inc.,<br>Delta                          | 4,400    |
| G. O'Neill        | UBC, Forest Sciences                     | C.P. Chanway                       | B.C. Research Corporation,<br>Vancouver            | 14,000   |
| C. Parfeniuk      | UBC, Metals and<br>Materials Engineering | F. Weinberg &<br>I.V. Samarasekera | Johnson Matthey Electronics,<br>Trail              | 14,000   |
| J.W. Quick        | UBC, Mechanical<br>Engineering           | I.S. Gartshore                     | H.A. Simons Ltd.,<br>Vancouver                     | 4,400    |
| D. Small          | UBC, Electrical<br>Engineering           | M.R. Ito                           | MacDonald Dettwiler and<br>Associates,<br>Richmond | 14,000   |
| M. Stazyk         | UBC, Physics                             | R.R. Johnson                       | TRIUMF,<br>Vancouver                               | 14,000   |
| I. Stevenson      | UVic, Biochemistry<br>and Microbiology   | S. Misra                           | Vernon Seed Orchard Co. Ltd.,<br>Prince George     | 7,600    |
| W.P. Stewart      | UBC, Civil Engineering                   | R.G. Campanella                    | Conetec Investigations Ltd.,<br>Burnaby            | 14,000   |
| J.C. Thornton     | UVic, Biochemistry and<br>Microbiology   | W. Kay                             | Microtek R & D Ltd.,<br>Sidney                     | 4,400    |
| A. Van Woudenberg | UBC, Forest Sciences                     | F.L. Bunnell                       | Tolko Industries Ltd.,<br>Kamloops                 | 14,000   |
| L. Zedel          | UBC, Oceanography                        | S. Pond                            | Institute of Ocean Sciences,<br>Sidney             | 14,000   |

## 2. RENEWAL AWARD - Year 2 (Competition GC-10) - *Continued*

| Name of Student      | University & Department | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | \$ Value |
|----------------------|-------------------------|-----------------------------------|----------------------------------------|----------|
| D. Morewood          | UVic, Biology           | R.A. Ring                         | Applied Bio-Nomics Ltd., Sidney        | 6,000    |
| Subtotal (29 awards) |                         |                                   |                                        | 328,667  |

## 3. RENEWAL AWARDS - Year 3 (Competition GC-10)

| Name of Student | University & Department       | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s)                                          | \$ Value |
|-----------------|-------------------------------|-----------------------------------|---------------------------------------------------------------------------------|----------|
| B. Allison      | UBC, Microbiology             | J.G. Levy                         | Quadra Logic Technologies Inc., Vancouver                                       | 14,000   |
| Y. Carriere     | SFU, Biological Sciences      | B.D. Roitberg                     | Agriculture Canada Research Stn. Summerland                                     | 14,000   |
| E. Charter      | UBC, Bio-Resource Engineering | K.V. Lo                           | Canadian Lysozyme Inc., Abbotsford                                              | 4,400    |
| L. de Montigny  | UBC, Forest Sciences          | G.F. Weetman                      | Western Forest Products Ltd., Vancouver                                         | 14,000   |
| J. Ens          | UBC, Electrical Engineering   | P. Lawrence                       | MacDonald Dettwiler and Assoc., Richmond                                        | 4,400    |
| A. Hornby       | UBC, Medical Genetics         | W.R. McMaster                     | Quadra Logic Technologies Inc., Vancouver                                       | 14,000   |
| R.O. Hudson     | UBC, Forest Resources         | D.L. Golding                      | Weyerhaeuser Canada Ltd., Okanagan Falls                                        | 14,000   |
| S.C. Johnson    | SFU, Biological Sciences      | L.J. Albright                     | 1) Pacific Biological Station, Nanaimo<br>2) Pacific Aqua Foods Ltd., Vancouver | 14,000   |
| A.D. Kot        | UBC, Electrical Engineering   | C. Leung                          | Mobile Data International Inc., Richmond                                        | 14,000   |
| M.L. Reid       | SFU, Biological Sciences      | B.D. Roitberg                     | Pacific Forestry Centre, Victoria                                               | 14,000   |

### 3. RENEWAL AWARDS - Year 3 (Competition GC-10) - *Continued*

| Name of Student      | University & Department | Name(s) of<br>Academic<br>Supervisor(s) | Name(s) of<br>Cooperating<br>Organization(s) | \$ Value         |
|----------------------|-------------------------|-----------------------------------------|----------------------------------------------|------------------|
| M. von Keyserlingk   | UBC, Animal Sciences    | J.A. Shelford                           | Ritchie-Smith Feeds Ltd.,<br>Abbotsford      | 14,000           |
|                      |                         |                                         |                                              | <hr/>            |
| Subtotal (11 awards) |                         |                                         |                                              | 134,800          |
|                      |                         |                                         |                                              | <hr/>            |
| Total (88 awards)    |                         |                                         |                                              | <u>1,064,280</u> |

# SCIENCE AND TECHNOLOGY AWARDS FOR RETURNING STUDENTS (S.T.A.R.S.) SCHOLARSHIPS AWARDED 1990-91

## 1. NEW AWARDS (Competition SC-3)

| Name of Student    | University & Department | Name of Academic Supervisor | Cooperating Organization              | \$ Value |
|--------------------|-------------------------|-----------------------------|---------------------------------------|----------|
| J.S.V. Carolsfeld  | UVic, Biology           | N.M. Sherwood               | Archipelago Marine Research, Victoria | 25,000   |
| Subtotal (1 Award) |                         |                             |                                       | 25,000   |

## 2. RENEWAL AWARDS - Year 2 (Competition SC-3)

| Name of Student     | University & Department | Name of Academic Supervisor | Cooperating Organization                       | \$ Value |
|---------------------|-------------------------|-----------------------------|------------------------------------------------|----------|
| P. MacDonald        | SFU, Computer Science   | W.S. Havens                 | MacDonald Dettwiler and Assoc., Richmond       | 25,000   |
| G.G. Cross          | UVic, Chemistry         | T.M. Fyles                  | C.B. Research International Corp., Sidney      | 25,000   |
| D.D. Heath          | UBC, Animal Science     | G.K. Iwama                  | Yellow Island Aquaculture Ltd., Campbell River | 25,000   |
| Subtotal (3 Awards) |                         |                             |                                                | 75,000   |

## 3. RENEWAL AWARDS - Year 3 (Competition SC-3)

| Name of Student    | University & Department | Name of Academic Supervisor | Cooperating Organization     | \$ Value       |
|--------------------|-------------------------|-----------------------------|------------------------------|----------------|
| A. Sy              | UBC, Civil Engineering  | R.G. Campanella             | Klohn Leonoff Ltd., Richmond | 25,000         |
| Subtotal (1 Award) |                         |                             |                              | 25,000         |
| Total (5 Awards)   |                         |                             |                              | <u>125,000</u> |

# **TRAINING EMPLOYMENT IN SCIENCE AND TECHNOLOGY (T.E.S.T.) POSITIONS SUPPORTED 1990-91 (1989-90 Committments)**

| <b>Award Recipient</b>                                        | <b>Employee</b> | <b>Education</b>                                             | <b>\$ Awarded</b> |
|---------------------------------------------------------------|-----------------|--------------------------------------------------------------|-------------------|
| AI Industries,<br>Surrey                                      | 1) J. Cooke     | 1) B.A.Sc.,<br>Mechanical Engineering<br>U. of Saskatchewan  | 1) 18,000         |
|                                                               | 2) C.W. Cheng   | 2) B.A.Sc.,<br>Mechanical Engineering<br>UBC                 | 2) R*             |
| Anderson Newalta<br>Environmental Services Corp.,<br>Richmond | 1) R. Chin      | 1) B.A.Sc.,<br>Bio-Resource Engineering<br>UBC               | 1) 18,000         |
|                                                               | 2) TBA          | 2) TBA                                                       | 2) 18,000         |
| Ballard Power Systems Inc.,<br>North Vancouver                | S. Ramji        | B.Sc.,<br>Mechanical Engineering<br>U of Calgary             | 17,640            |
| Brockton Electronics Ltd.,<br>Vancouver                       | 1) V. Par       | 1) Diploma,<br>Quality Assurance,<br>BCIT                    | 1) 14,400         |
|                                                               | 2) TBA          | 2) TBA                                                       | 2) R*             |
| Capstan Management Inc.,<br>Victoria                          | TBA             | TBA                                                          | 9,000             |
| Crystal Computer<br>Services Inc.,<br>Vancouver               | H. S. Lee       | B.Sc.,<br>Computer Science,<br>Ohio State University         | 18,000            |
| CTF Systems Inc.,<br>Port Coquitlam                           | 1) M. Veronesi  | 1) B.Sc.,<br>Applied Physics<br>SFU                          | 1) 14,400         |
|                                                               | 2) TBA          | 2) TBA                                                       | 2) 12,000         |
| Dayton & Knight Ltd.,<br>West Vancouver                       | D. Sayers       | Diploma,<br>Civil Engineering Technology<br>Okanagan College | 16,560            |
| EDT Manufacturing Ltd.,<br>Victoria                           | T. Chaudhary    | M.A.Sc.,<br>Electrical & Computer Engineering<br>UVic        | 18,000            |
| ECL Envirowest<br>Consultants Ltd.,<br>New Westminster        | R. Sickmuller   | M.Sc.,<br>Natural Resource Mgmt.<br>University of Leicester  | 17,280            |

**T.E.S.T. POSITIONS SUPPORTED - Continued**

| <b>Award Recipient</b>                     | <b>Employee</b> | <b>Education</b>                                           | <b>\$ Awarded</b> |
|--------------------------------------------|-----------------|------------------------------------------------------------|-------------------|
| ECL Industries Ltd.,<br>Vancouver          | TBA             | TBA                                                        | 18,000            |
| ENSC Ventures Corp.,<br>Burnaby            | M. Fowler       | B.A.Sc.,<br>Computer Engineering<br>SFU                    | 18,000            |
| Excel Engineering Ltd.,<br>Surrey          | T. Barnett      | B.A.Sc.<br>Mechanical Engineering<br>Lakehead University   | 18,000            |
| Fitz-Wright Company Ltd.,<br>Langley       | D. Richardson   | Diploma<br>Operations Mgmt.<br>BCIT                        | 14,400            |
| Gentech Engineering Inc.,<br>Chase         | P. Hickerson    | Diploma<br>General Studies<br>Okanagan College             | 16,560            |
| Independent Power Corp.,<br>Surrey         | R. Reyes        | Diploma<br>Electrical Engineering Technology<br>BCIT       | 7,200             |
| INETCO Systems Ltd.,<br>Burnaby            | W. Chao         | B.Sc.<br>Computer Science<br>SFU                           | 17,784            |
| JR Laboratories Inc.,<br>Burnaby           | S. Datta        | M.Sc.<br>Food Chemistry<br>UBC                             | 17,153            |
| KIS Information Systems Inc.,<br>Vancouver | TBA             | TBA                                                        | 18,000            |
| McCarney Technologies Inc.,<br>Vancouver   | E. Lee          | B.A.Sc.<br>Electrical Engineering<br>UBC                   | 15,600            |
| N/C Machining Ltd.,<br>Richmond            | P. Westwick     | B.Sc.<br>Computer Science<br>UBC                           | 3,802             |
| Prodigy Technologies Corp.,<br>Vancouver   | P. Kowalow      | Diploma<br>Computer Systems<br>Vancouver Community College | 18,000            |

# **T.E.S.T. POSITIONS SUPPORTED - Continued**

| <b>Award Recipient</b>                                 | <b>Employee</b>  | <b>Education</b>                                         | <b>\$ Awarded</b>     |
|--------------------------------------------------------|------------------|----------------------------------------------------------|-----------------------|
| Robert Allan Ltd.,<br>Vancouver                        | H. W. H. Chung   | M.Sc.<br>Naval Architecture<br>U. of California, Berkley | 9,000                 |
| Sanctuary Woods Inc.,<br>Victoria                      | R. McMurtry      | Diploma<br>Information Technology<br>Capilano College    | 15,602                |
| SDI Software Design Inc.,<br>Vancouver                 | D. Cheng         | Diploma<br>Computer Systems<br>BCIT                      | 10,800                |
| Seastar Optics Inc.,<br>Sidney                         | G. Lick          | B.Sc.<br>Physics<br>UVic                                 | 12,600                |
| Sierra-Misco<br>Environment Ltd.,<br>Victoria          | M. Hearst        | B.Sc.<br>Elect. Engineering<br>UVic                      | 18,000                |
| Stewart-EBA Consulting Ltd.,<br>Kelowna                | TBA              | TBA                                                      | 13,680                |
| Talkie Tooter (Canada) Ltd.,<br>Vancouver              | 1) R. Popove     | 1) Diploma<br>Engineering Technology<br>Okanagan College | 1) 18,000             |
|                                                        | 2) J. Hutchinson | 2) B.Sc.<br>Engineering<br>UVic                          | 2) 18,000             |
|                                                        | 3) TBA           | 3) TBA                                                   | 3) R*                 |
| Thurber Environmental<br>Consultants Ltd.,<br>Victoria | G. Tamblyn       | B.Sc.<br>Biology<br>UVic                                 | 18,000                |
| <b>Total (33 positions)</b>                            |                  |                                                          | <b><u>507,461</u></b> |

R\* replacement of originally supported employee

# **MARKET ASSESSMENT FOR RESEARCH AND TECHNOLOGY (M.A.R.T.) GRANTS AWARDED 1990-91**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                | <b>PROJECT DESCRIPTION</b>                                                                          | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------|
| Mr. C. Anderson<br>Credit Systems Intl.,<br>Burnaby          | PortaCredit & Direct Credit                                                                         | 16,273                                    |
| Mr. V. Andrusieck<br>Virtual Access,<br>Vancouver            | Video Suite (A Low cost Integrated<br>Video editing system)                                         | 20,000                                    |
| Mr. J. Baroux<br>Pacific Gate Software Corp.,<br>Burnaby     | AphiX Image Dbase                                                                                   | 16,500                                    |
| Mr. J. Baroux<br>Pacific Fluorotec,<br>Burnaby               | Integrating Fluorometer<br>(Fluorescence measurement of seedlings)                                  | 19,750                                    |
| Mr. D. Brown<br>Sun Dew Foods,<br>Okanagan Falls             | Dried Apple flakes from<br>Apple Pomace                                                             | 20,000                                    |
| Dr. G. Cooper<br>Glen Cooper & Associates,<br>Vancouver      | Nurse Scheduler                                                                                     | 18,800                                    |
| Mr. D. Cordingley<br>Spectrum Signal Processing,<br>Burnaby  | Digital Signal Processing Board for<br>Personal Computers "DSP/PC mkt"                              | 19,957                                    |
| Mr. J. Culter<br>MEDINET,<br>Vancouver                       | Physician Linking System<br>(Secure medical communications)                                         | 12,000                                    |
| Dr. B. Dunwoody<br>UBC, Mechanical Engineering,<br>Vancouver | High-Torque Fluid Power Stepping<br>Motor/Digital Hydraulic Actuator<br>(Assessment on two devices) | 20,000                                    |
| Mr. H. Foo<br>Wescan Labs,<br>Richmond                       | Taxol, an Anti-Cancer<br>Pharmaceutical                                                             | 20,000                                    |
| Dr. R. Goldstein<br>UBC, Commerce,<br>Vancouver              | View Creation System<br>(Relational database)                                                       | 19,400                                    |

# **M.A.R.T. GRANTS AWARDED - Continued**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                                                             | <b>PROJECT DESCRIPTION</b>                                                   | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------|
| Mr. D. Hardt<br>Powermaster,<br>Vancouver                                                                 | Anaerobic Testing Device                                                     | 15,000                                    |
| Mr. R. Killen<br>Brookdale Intl.,<br>Vancouver                                                            | Disposable Emergency<br>Breathing System (DEBS)                              | 17,250                                    |
| Dr. C. Laszlo<br>Dr. C. Hershler<br>UBC, Clinical Engineering,<br>G.F. Strong Rehab. Center,<br>Vancouver | Computerized Driver<br>Assessment Module "CDAM"                              | 17,620                                    |
| Dr. P. Lawrence<br>UBC, Electrical Engineering,<br>Vancouver                                              | Coordinated motion robotic system<br>for machines that rotate about one axis | 19,388                                    |
| Dr. W. Little<br>UVIC, Engineering,<br>Victoria                                                           | Array Tag Technology                                                         | 17,000                                    |
| Dr. J. Moehr<br>UVIC, Health,<br>Victoria                                                                 | Computer Technology in<br>Medical Communications "CTMC"                      | 5,000                                     |
| Mr. R. Porter<br>EDT Manufacturing,<br>Victoria                                                           | Wireless Switch                                                              | 20,000                                    |
| Ms. J. Renwick<br>Pacific Asia Tech.,<br>Vancouver                                                        | Modified Atmospheric Packaging<br>Technology "MAPT Technology"               | 18,200                                    |
| Dr. F. Sassani<br>UBC, Mechanical Engineering,<br>Vancouver                                               | Computer Assisted Fab.<br>of Orthodontic Appliances                          | 20,000                                    |
| Dr. J. Scrimger<br>JASCO Research,<br>Sidney                                                              | SPAWN (Signal Processing<br>Workstation)                                     | 19,985                                    |
| Mr. A. Severinson<br>Omnex Engineering,<br>Coquitlam                                                      | License Free Control and<br>Telemetry radio products                         | 12,466                                    |

**M.A.R.T. GRANTS AWARDED - Continued**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                       | <b>PROJECT DESCRIPTION</b>                                           | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|---------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------|
| Mr. P. Smith<br>PWS Technology,<br>Kelowna                          | Low Alcohol Beverages                                                | 20,000                                    |
| Mr. H. Snipstead<br>Delta Transportation Products Ltd.,<br>Richmond | Remote Air Pressure System<br>"RAPS"                                 | 10,700                                    |
| Dr. B. Truax<br>SFU, Computer Science,<br>Burnaby                   | Digital Audio Processor                                              | 20,000                                    |
| Dr. B. Turrell<br>UBC, Physics,<br>Vancouver                        | Superheated Super Conducting<br>Granule Detector (Superconductivity) | 10,000                                    |
| Dr. I. Yellowley<br>UBC, Mechanical Engineering,<br>Vancouver       | Multiprocessor based<br>Testing Device                               | 16,500                                    |
|                                                                     | <b>TOTAL (27 awards)</b>                                             | <hr/> <b><u>461,789</u></b>               |

## SCIENCE COUNCIL OF B.C. -

### Schedule of Health Development Fund (HDF-SCBC) Commitments for the year ended March 31, 1991

#### 1. HEALTH DEVELOPMENT FUND (SCBC) COMPETITION #2 (HDF-2)

| GRANT RECIPIENT<br>& ORGANIZATION                            | PROJECT DESCRIPTION                                                                                    | TOTAL \$<br>COMMITTED<br>1990-91 |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------|
| Mr. G.F. Auchinleck<br>Andronic Devices Ltd.,<br>Richmond    | Development and Evaluation of Advanced Robotic Manipulators for Surgery, Phase II                      | 115,600                          |
| Ms. M.J. Breault<br>UBC, Orthopaedics                        | Antibiotic Loaded Joint Prosthesis for the Management of Infection                                     | 14,240                           |
| Dr. P.R. Cullis<br>Canadian Liposome Co.,<br>North Vancouver | Liposomal Anticancer Pharmaceuticals                                                                   | 35,080                           |
| Dr. D. Dolphin<br>UBC, Chemistry                             | Development of Third Generation Photosensitizers and their Delivery Systems for Photodynamic Therapy   | 122,000                          |
| Dr. W. Godolphin<br>Andronic Technologies Inc.,<br>Vancouver | An Automated Blood Processing System                                                                   | 124,200                          |
| Mr. R.E. Hannah<br>Arbutus Society for Children,<br>Victoria | Development of Computer Aided Design and Manufacturing Techniques (CAD/CAM) for use in Special Seating | 49,340                           |
| Dr. C. Hershler<br>G.F. Strong Centre,<br>Vancouver          | Development of a Computerized Driver Assessment Module (CDAM)                                          | 189,638                          |
| Dr. C. Laszlo<br>UBC, Electrical Engineering                 | Assistive Listening Devices (ALDs) for the Hard of Hearing                                             | 62,756                           |

**1. H.D.F. (SCBC) COMPETITION #2 (HDF-2) - Continued**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                             | <b>PROJECT DESCRIPTION</b>                              | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|---------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------|
| Dr. T. Richardson<br>Richardson Industries,<br>North Vancouver            | Thermoregulator for Applications in Medical<br>Research | 40,000                                    |
| Awards Declined                                                           | 1 Award                                                 | 43,000                                    |
| <b>HDF - SCBC #2 (HDF-2) Total \$ Committed 1990-91<br/>(10 Projects)</b> |                                                         | <b><u>795,854</u></b>                     |

**SCIENCE COUNCIL OF B.C. -  
B.C. HEALTH RESEARCH FOUNDATION**  
Schedule of Health Development Fund (HDF-JOINT) Commitments for the year  
ended March 31, 1991

**1. HEALTH DEVELOPMENT FUND (SCBC-JOINT) COMPETITION #2 (HDFJ-2)**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                   | <b>PROJECT DESCRIPTION</b>                                                                                                                 | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Ms. M.J. Breault<br>UBC, Orthopaedics                           | Clinical Evaluation and Improvement of<br>Automated Operative Assistance for Orthopaedic<br>Surgery                                        | 50,000                                    |
| Dr. D. Cooper<br>Sunny Hill Hospital for Children,<br>Vancouver | Computerized Optronics Controller for<br>Independent Use of Wheelchair and<br>Communication Aids by Children with Physical<br>Disabilities | 50,000                                    |
| Dr. P. Coy<br>B.C. Cancer Agency,<br>Victoria                   | Lung Cancer Economic Evaluation Study                                                                                                      | 119,200                                   |

# 1. H.D.F. (SCBC-JOINT) COMPETITION #2 (HDFJ-2) - Continued

| GRANT RECIPIENT<br>& ORGANIZATION                            | PROJECT DESCRIPTION                                                                                                                                                                    | TOTAL \$<br>COMMITTED<br>1990-91 |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Mr. F.G. Dillon<br>J.A. Pentland Ltd.,<br>Vancouver          | Collaborative Study of the Cost Effectiveness and Efficiency of CAD/CAM in the Design, Manufacture and Delivery System of Prosthetic Appliances                                        | 70,194                           |
| Dr. R. Doll<br>B.C. Cancer Agency,<br>Vancouver              | Clinical and Economic Effects of the Learning Enhancement System for Chemotherapy Treatment                                                                                            | 42,803                           |
| Dr. P.F. Fancourt-Smith<br>UBC, Anaesthesiology              | Evaluation and Improvement of Automated Systems for Intravenous Regional Anaesthesia                                                                                                   | 73,150                           |
| Dr. W. Godolphin<br>Andronic Technologies Inc.,<br>Vancouver | A Clinical Laboratory Workflow Simulation and Optimization System                                                                                                                      | 88,780                           |
| Dr. J. Goldie<br>B.C. Cancer Agency<br>Vancouver             | Investigational Drug Trials Unit                                                                                                                                                       | 100,000                          |
| Dr. C. Hershler<br>G.F. Strong Centre,<br>Vancouver          | Computer Activated Test of Tactile Neglect and Extinction (CATTNE)                                                                                                                     | 41,152                           |
| Dr. C. Hertzman<br>UBC, Health Care & Epidemiology           | Parkinson's Disease: A Case-Control Study of Occupational and Environmental Risk Factors                                                                                               | 23,142                           |
| Dr. J. Levy<br>Quadra Logic Technologies Inc.,<br>Vancouver  | Development of Bone Marrow Purging Technology for Autologous Bone Marrow Transplantation in Acute Leukemia and Development of Sensitive Probes for Evaluation of the Purging Procedure | 60,000                           |
| Dr. A. Macnab<br>B.C. Children's Hospital,<br>Vancouver      | Efficacy and Safety of Midazolam for the Sedation of Children Following Open Heart Surgery                                                                                             | 41,035                           |

**1. H.D.F. (SCBC-JOINT) COMPETITION #2 (HDFJ-2) - Continued**

| <b>GRANT RECIPIENT<br/>&amp; ORGANIZATION</b>                             | <b>PROJECT DESCRIPTION</b>                                                                                                               | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Ms. L. Roxborough<br>Sunny Hill Hospital for Children,<br>Vancouver       | Development of a Quantitative Measure of Seated<br>Postural Control in Children                                                          | 64,048                                    |
| Dr. C.H. Sherlock<br>UBC, Medical Microbiology                            | Use of Nucleic Acid Probes and the Polymerase<br>Chain Reaction for Detection and Typing of<br>Human Papillomaviruses in Cervical Tissue | 85,000                                    |
| Dr. B. Smith<br>Acquired Intelligence Inc.,<br>Victoria                   | The Collaborative Evaluation and Application of<br>a Knowledge-Based System for Child Clinical<br>Neuropsychology                        | 88,520                                    |
| <b>HDF-Joint #2 (HDFJ-2) Total \$ Committed 1990-91<br/>(15 Projects)</b> |                                                                                                                                          | <u><u>997,006</u></u>                     |

## SPECIAL INITIATIVE FUND

| AWARD RECIPIENT<br>& ORGANIZATION                           | PROJECT DESCRIPTION                                                                                                                 | TOTAL \$<br>COMMITTED<br>1990-91 |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Dr. J.H. Borden<br>SFU, Biological Sciences                 | Chemistry Ecology of Insect Pests                                                                                                   | 125,000                          |
| Dr. S. Cherry<br>UBC, Civil Engineering                     | Upgrading Earthquake Seismic<br>Facility at UBC                                                                                     | 155,000                          |
| Mr. I. Dowdeswell<br>MPR Teltech Ltd<br>Burnaby             | NSERC Industrial Chair<br>in Expert Systems                                                                                         | 125,000                          |
| Dr. J. Goldie<br>B.C. Cancer Agency,<br>Vancouver           | Investigational Unit for Clinical<br>Drug Trials                                                                                    | 52,000                           |
| Dr. H. Kimmins<br>UBC, Forest Sciences                      | FORTOON - The Forestry<br>Cartoon                                                                                                   | 30,000                           |
| Dr. A. Leung<br>SFU, Engineering Sciences                   | Strategic Plan for Developing<br>Opportunities in Microdynamics<br>Technology in B.C.                                               | 18,750                           |
| Mr. B. McCloy<br>Council of Forest Industries,<br>Vancouver | Industrial Research Chair in<br>Forest Products Waste<br>Management at UBC                                                          | 125,000                          |
| Mr. G. Plant<br>MacMillan Bloedel Research,<br>Vancouver    | B.C. Carbon Study                                                                                                                   | 147,000                          |
| Mr. P. Putland<br>Phero Tech Inc.,<br>Delta                 | Industrial Research Chair in<br>the Chemical Ecology of<br>Insect Pests at SFU                                                      | 125,000                          |
| Mr. R. Redden<br>Crystar Research Inc.,<br>Victoria         | Industrial Research Chair in<br>the Optical Properties and<br>Characterization of Electronic and<br>Optoelectronic Materials at SFU | 125,000                          |
| Mr. J. Scott<br>J.C. Scott Construction Ltd.,<br>Vancouver  | Industrial Research Chair in<br>Computer Integrated Design and<br>Construction at UBC                                               | 50,000                           |
| Dr. J. Spence<br>B.C.A.R.D.C.,<br>North Vancouver           | Definition Study and Business Plan<br>Development of Field Facilities<br>for Aquaculture Research and<br>Development                | 26,000                           |

**SPECIAL INITIATIVE FUND - Continued**

| <b>AWARD RECIPIENT<br/>&amp; ORGANIZATION</b>              | <b>PROJECT DESCRIPTION</b>                                             | <b>TOTAL \$<br/>COMMITTED<br/>1990-91</b> |
|------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------|
| Dr. A. Winter<br>Microtel Pacific Research Ltd.<br>Burnaby | Industrial Research Chair in<br>Radio Frequency Engineering<br>at UVic | 125,000                                   |
| S.P.A.R.K.<br>Biotechnology Sector                         | Business Plan for the B.C.<br>Biotechnolgy Centre                      | 143,500                                   |
| S.P.A.R.K.<br>Information Technology Sector                | Business Plan for the B.C.<br>Software Productivity Consortium         | 30,000                                    |
| S.P.A.R.K.<br>Manufacturing Sector                         | Business Plan for the B.C.<br>Manufacturing Technology Centre          | 45,000                                    |
|                                                            | <b>Total (16 projects)</b>                                             | <b><u>1,447,250</u></b>                   |

SCIENCE COUNCIL OF  
BRITISH COLUMBIA

**FINANCIAL STATEMENTS**

FOR THE YEAR ENDED  
MARCH 31, 1991

## AUDITOR'S REPORT

To the Minister of Advanced Education, Training and Technology

*We have audited the balance sheet of the Science Council of British Columbia as at March 31, 1991 and the statements of Program receipts, expenditures and appropriations; S.P.A.R.K. receipts, expenditures and appropriations; operations receipts, expenditures and appropriations; and changes in financial position for the year then ended. These financial statements are the responsibility of the Council's management. Our responsibility is to express an opinion on these financial statements based on our audit.*

*We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.*

*In our opinion, these financial statements present fairly, in all material respects, the financial position of the Council as at March 31, 1991 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principals, as modified by Note 2 to the financial statements.*

*Dyke & Howard*

Vancouver, B.C.  
May 28, 1991

Chartered Accountants

# BALANCE SHEET AS AT MARCH 31, 1991

## ASSETS

|                        | <u>1991</u>          | <u>1990</u>          |
|------------------------|----------------------|----------------------|
| CASH                   | \$ 1,768,712         | \$ 1,583,392         |
| SHORT-TERM INVESTMENTS | 18,553,714           | 7,247,788            |
| ACCOUNTS RECEIVABLE    | 170,200              | 104,618              |
| GRANTS RECEIVABLE      | 1,813,344            | 11,057,423           |
| INTEREST RECEIVABLE    | <u>229,800</u>       | <u>43,953</u>        |
|                        | \$ <u>22,535,770</u> | \$ <u>20,037,174</u> |

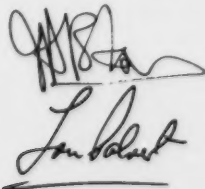
## LIABILITIES

|                                          |                   |                   |
|------------------------------------------|-------------------|-------------------|
| ACCOUNTS PAYABLE AND ACCRUED LIABILITIES | \$ <u>370,560</u> | \$ <u>245,967</u> |
|------------------------------------------|-------------------|-------------------|

## APPROPRIATIONS

|                                                                                |                      |                      |
|--------------------------------------------------------------------------------|----------------------|----------------------|
| PROGRAMS (Note 3)                                                              | 21,986,669           | 19,657,389           |
| STRATEGIC PLANNING FOR APPLIED RESEARCH<br>AND KNOWLEDGE (S.P.A.R.K.) (Note 5) | 41,657               | 48,485               |
| OPERATIONS                                                                     | <u>136,884</u>       | <u>85,333</u>        |
|                                                                                | <u>22,165,210</u>    | <u>19,791,207</u>    |
|                                                                                | \$ <u>22,535,770</u> | \$ <u>20,037,174</u> |

Approved by the Council



Two handwritten signatures are present. The top signature is in cursive and appears to be 'J. B. ...'. The bottom signature is also in cursive and appears to be 'L. ...'. Both signatures are written over a horizontal line.

STATEMENT OF PROGRAM RECEIPTS, EXPENDITURES AND  
APPROPRIATIONS  
YEAR ENDED MARCH 31, 1991

| PROGRAM RECEIPTS                                                     | <u>1991</u>              | <u>1990</u>              |
|----------------------------------------------------------------------|--------------------------|--------------------------|
| Grants from the Province of British Columbia<br>(Schedule 1)         | \$ 15,555,408            | \$ 16,368,946            |
| Contribution from the British Columbia Health<br>Research Foundation | 133,622                  | 359,214                  |
| Interest                                                             | 2,056,649                | 1,392,514                |
| Refunds of prior years' program expenditures                         | 153,164                  | 84,142                   |
| Other                                                                | <u>11,600</u>            | <u>-</u>                 |
|                                                                      | <u>17,910,443</u>        | <u>18,204,816</u>        |
| <br>PROGRAM EXPENDITURES (Schedule 2)                                | <br>14,750,163           | <br>11,834,026           |
| <br>TRANSFER TO OPERATIONS                                           | <br>331,000              | <br>594,410              |
| <br>TRANSFER TO S.P.A.R.K.                                           | <br><u>500,000</u>       | <br><u>545,000</u>       |
|                                                                      | <u>15,581,163</u>        | <u>12,973,436</u>        |
| <br>EXCESS OF RECEIPTS OVER EXPENDITURES                             | <br>2,329,280            | <br>5,231,380            |
| <br>PROGRAM APPROPRIATIONS, beginning of year                        | <br><u>19,657,389</u>    | <br><u>14,426,009</u>    |
| <br>PROGRAM APPROPRIATIONS, end of year                              | <br><u>\$ 21,986,669</u> | <br><u>\$ 19,657,389</u> |

STATEMENT OF S.P.A.R.K. RECEIPTS,  
EXPENDITURES AND APPROPRIATIONS  
YEAR ENDED MARCH 31, 1991

|                                                     | <u>1991</u>      | <u>1990</u>      |
|-----------------------------------------------------|------------------|------------------|
| <b>S.P.A.R.K. RECEIPTS</b>                          |                  |                  |
| Grants from the Province of British Columbia        | \$ 30,000        | \$ 90,000        |
| Grants from the Government of Canada                | 212,173          | 200,000          |
| Transfer from Program                               | 500,000          | 545,000          |
| Program grant - Special Initiatives Fund            | 300,000          | -                |
| Other receipts                                      | <u>183,740</u>   | <u>127,284</u>   |
|                                                     | <u>1,225,913</u> | <u>962,284</u>   |
| <b>S.P.A.R.K. EXPENDITURES</b>                      |                  |                  |
| Operations                                          |                  |                  |
| Communications and travel                           | 86,374           | 74,171           |
| Co-ordinator fees                                   | 49,000           | 86,500           |
| Furniture and equipment                             | 12,595           | 89,009           |
| Office                                              | 44,367           | 28,348           |
| Rent and leasehold improvements                     | 18,047           | 56,522           |
| Salaries and benefits                               | 78,674           | 42,723           |
| Workshops and forums                                | <u>121,507</u>   | <u>65,190</u>    |
|                                                     | <u>410,564</u>   | <u>442,463</u>   |
| Sectors                                             |                  |                  |
| Aerospace                                           | -                | 3,000            |
| Agriculture                                         | 4,500            | 7,500            |
| Aquatic resources                                   | 45,000           | 40,332           |
| Biotechnology                                       | 89,078           | 35,180           |
| Construction                                        | 48,761           | 65,335           |
| Energy                                              | 10,004           | 1,039            |
| Environment                                         | 117,545          | 89,856           |
| Fiscal                                              | 38,673           | 36,403           |
| Forestry                                            | 499              | 25,776           |
| Health                                              | 68,124           | 77,064           |
| Information technology                              | 172,311          | 61,069           |
| Manufacturing                                       | 114,757          | 96,874           |
| Mining                                              | 68,999           | 96,866           |
| Opportunities in space                              | -                | 12,321           |
| Superconductivity                                   | -                | 2,000            |
| Transportation                                      | <u>43,926</u>    | <u>12,161</u>    |
|                                                     | <u>822,177</u>   | <u>662,776</u>   |
| <b>TOTAL EXPENDITURES</b>                           | <u>1,232,741</u> | <u>1,105,239</u> |
| <b>DEFICIENCY OF RECEIPTS OVER EXPENDITURES</b>     | 6,828            | 142,955          |
| <b>S.P.A.R.K. APPROPRIATIONS, beginning of year</b> | <u>48,485</u>    | <u>191,440</u>   |
| <b>S.P.A.R.K. APPROPRIATIONS, end of year</b>       | <u>\$ 41,657</u> | <u>\$ 48,485</u> |

STATEMENT OF OPERATIONS RECEIPTS,  
EXPENDITURES AND APPROPRIATIONS  
YEAR ENDED MARCH 31, 1991

|                                              | <u>1991</u>              | <u>1990</u>             |
|----------------------------------------------|--------------------------|-------------------------|
| <b>OPERATIONS RECEIPTS</b>                   |                          |                         |
| Grant from the Province of British Columbia  | \$ 900,000               | \$ 300,000              |
| Interest                                     | 15,535                   | 7,872                   |
| Transfer from Program                        | 331,000                  | 594,410                 |
| Recoveries                                   |                          |                         |
| British Columbia Health Research Foundation  | 392,030                  | 175,382                 |
| Other                                        | <u>38,286</u>            | <u>13,823</u>           |
|                                              | <u>1,676,851</u>         | <u>1,091,487</u>        |
| <b>EXPENDITURES</b>                          |                          |                         |
| Computer services                            | 9,290                    | 4,216                   |
| Consulting and temporary staff               | 59,627                   | 32,113                  |
| Dues and memberships                         | 3,931                    | 955                     |
| Furniture and equipment                      | 149,256                  | 61,904                  |
| Leasehold improvements                       | 5,320                    | 2,614                   |
| Meetings                                     | 30,848                   | 16,476                  |
| Moving expenses                              | 23,952                   | -                       |
| Personnel - recruitment                      | 5,397                    | 48,156                  |
| Photocopying and printing                    | 43,960                   | 52,217                  |
| Postage and courier                          | 61,448                   | 33,375                  |
| Professional development                     | 8,802                    | 9,510                   |
| Professional fees                            | 21,578                   | 14,061                  |
| Publications                                 | 3,961                    | 3,517                   |
| Public relations                             | 14,982                   | -                       |
| Rent                                         | 68,711                   | 63,586                  |
| Salaries and employee benefits               | 981,237                  | 628,641                 |
| Stationery and supplies                      | 32,593                   | 15,913                  |
| Telephone                                    | 29,560                   | 21,043                  |
| Travel                                       | <u>70,847</u>            | <u>57,938</u>           |
|                                              | <u>1,625,300</u>         | <u>1,066,235</u>        |
| EXCESS OF RECEIPTS OVER EXPENDITURES         | 51,551                   | 25,252                  |
| OPERATIONS APPROPRIATIONS, beginning of year | <u>85,333</u>            | <u>60,081</u>           |
| OPERATIONS APPROPRIATIONS, end of year       | \$ <u><u>136,884</u></u> | \$ <u><u>85,333</u></u> |

STATEMENT OF CHANGES IN FINANCIAL POSITION  
YEAR ENDED MARCH 31, 1991

| CASH PROVIDED FOR (USED BY)                           | <u>1991</u>          | <u>1990</u>         |
|-------------------------------------------------------|----------------------|---------------------|
| OPERATING ACTIVITIES                                  |                      |                     |
| Excess (deficiency) of receipts over disbursements    |                      |                     |
| Program                                               | \$ 2,329,280         | \$ 5,231,380        |
| S.P.A.R.K.                                            | (6,828)              | (142,955)           |
| Operations                                            | 51,551               | 25,252              |
| Net change in non-cash working capital accounts       | <u>9,117,243</u>     | <u>(8,207,517)</u>  |
| INCREASE (DECREASE) IN CASH DURING THE YEAR           | 11,491,246           | (3,093,840)         |
| CASH AND SHORT-TERM INVESTMENTS,<br>beginning of year | <u>8,831,180</u>     | <u>11,925,020</u>   |
| CASH AND SHORT-TERM INVESTMENTS,<br>end of year       | <u>\$ 20,322,426</u> | <u>\$ 8,831,180</u> |

# Schedule 1

## SCHEDULE OF PROGRAM RECEIPTS FROM THE PROVINCE OF BRITISH COLUMBIA YEAR ENDED MARCH 31, 1991

| PROVINCIAL GRANTS                                          | <u>1991</u>          | <u>1990</u>          |
|------------------------------------------------------------|----------------------|----------------------|
| Ministry of Advanced Education, Training<br>and Technology |                      |                      |
| - Program Base                                             | \$ 4,000,000         | \$ 3,500,000         |
| - HDF                                                      | 1,472,549            | 1,456,796            |
| - MART                                                     | -                    | 237,150              |
| - Public Awareness                                         | -                    | 175,000              |
| - STDF                                                     | 8,155,359            | 8,500,000            |
| - STDF Supplement                                          | -                    | 2,000,000            |
| - TEST                                                     | -                    | 500,000              |
|                                                            | <u>13,627,908</u>    | <u>16,368,946</u>    |
| Ministry of Environment                                    |                      |                      |
| - University Centres of Excellence                         | <u>1,927,500</u>     | <u>-</u>             |
|                                                            | <u>\$ 15,555,408</u> | <u>\$ 16,368,946</u> |

**SCIENCE COUNCIL OF BRITISH COLUMBIA**  
**SCHEDULE OF COMMITMENTS AND DISBURSEMENTS OF**  
**SCIENCE COUNCIL PROGRAM GRANTS**  
**YEAR ENDED MARCH 31, 1991**

**Schedule 2**

|                                     | Known<br>Outstanding<br>Commitments<br>Beginning<br>Of Year | Additional<br>Commitments<br>During Year | Commitment<br>Reductions<br>During Year | Disbursed<br>During Year | Known<br>Outstanding<br>Commitments<br>End Of Year |
|-------------------------------------|-------------------------------------------------------------|------------------------------------------|-----------------------------------------|--------------------------|----------------------------------------------------|
| <b>AGAR</b>                         |                                                             |                                          |                                         |                          |                                                    |
| Research Competition #13            | \$ 32,622                                                   | \$ -                                     | \$ -                                    | \$ -                     | \$ 32,622                                          |
| Research Competition #16            | 67,851                                                      | -                                        | 44,871                                  | 14,781                   | 8,199                                              |
| Research Competition #17            | 134,766                                                     | -                                        | -                                       | 110,696                  | 24,070                                             |
| Research Competition #18            | 241,316                                                     | -                                        | 99,487                                  | 137,329                  | 4,500                                              |
| Research Competition #19            | 690,594                                                     | -                                        | 46,351                                  | 509,603                  | 134,640                                            |
| Research Competition #20            | <u>1,572,876</u>                                            | <u>-</u>                                 | <u>2,254</u>                            | <u>1,253,588</u>         | <u>317,034</u>                                     |
|                                     | 2,740,025                                                   | -                                        | 192,963                                 | 2,025,997                | 521,065                                            |
| <b>GREAT - GC10</b>                 | -                                                           | 1,064,280                                | 21,965                                  | 1,042,315                | -                                                  |
| HDF 1988/89 - SCBC                  | 556,602                                                     | -                                        | 70,895                                  | 393,943                  | 91,764                                             |
| HDF 1989/90 - SCBC                  | -                                                           | 959,694                                  | 43,000                                  | 147,439                  | 769,255                                            |
| HDF 1988/89 - JOINT                 | 664,094                                                     | -                                        | 9,334                                   | 372,690                  | 282,070                                            |
| HDF 1989/90 - JOINT                 | -                                                           | 997,006                                  | -                                       | 292,395                  | 704,611                                            |
| IPDF                                | 218,750                                                     | 275,000                                  | 36,413                                  | 301,087                  | 156,250                                            |
| MART 1988/89                        | 62,742                                                      | -                                        | 3,534                                   | 43,383                   | 15,825                                             |
| MART 1989/90                        | 166,900                                                     | -                                        | 2,897                                   | 87,353                   | 76,650                                             |
| MART 1990/91                        | -                                                           | 469,789                                  | -                                       | 121,949                  | 347,840                                            |
| SA - 1                              | 8,721,789                                                   | 82,495                                   | 528,072                                 | 5,207,656                | 3,068,556                                          |
| SA - 2                              | -                                                           | 3,650,538                                | 41,773                                  | 1,400,923                | 2,207,842                                          |
| SA - 3                              | -                                                           | 6,919,493                                | 65,005                                  | 340,707                  | 6,513,781                                          |
| STARS 1990/91                       | -                                                           | 125,000                                  | 12,500                                  | 112,500                  | -                                                  |
| STDF 1988/89                        | 2,494,940                                                   | -                                        | 748,759                                 | 1,742,641                | 3,540                                              |
| TEST 1989/90                        | <u>500,000</u>                                              | <u>-</u>                                 | <u>1,539</u>                            | <u>83,816</u>            | <u>414,645</u>                                     |
|                                     | <u>16,125,842</u>                                           | <u>14,543,295</u>                        | <u>1,778,649</u>                        | <u>13,716,794</u>        | <u>15,173,694</u>                                  |
| <b>SPECIAL REQUESTS</b>             |                                                             |                                          |                                         |                          |                                                    |
| VITRA                               | 15,000                                                      | -                                        | -                                       | 13,500                   | 1,500                                              |
| University Construction Chair       | -                                                           | 5,000                                    | -                                       | -                        | 5,000                                              |
| Peace Region Enterprise Dev. Centre | -                                                           | 10,000                                   | -                                       | 9,000                    | 1,000                                              |
| Vancouver Island Technology Centre  | -                                                           | 36,000                                   | -                                       | 9,000                    | 27,000                                             |
| Marketing Study                     | -                                                           | 26,600                                   | -                                       | 9,722                    | 16,878                                             |
| B.C. Tech - Transnational study     | -                                                           | 11,122                                   | -                                       | 11,122                   | -                                                  |
| Small Initiatives Fund              | -                                                           | 6,547                                    | -                                       | 6,547                    | -                                                  |
| Intellectual Property Seminar       | 19,000                                                      | -                                        | -                                       | 12,584                   | 6,416                                              |
| IPR - First to File                 | -                                                           | 765                                      | -                                       | 765                      | -                                                  |
| Marketing and Mgmt. Skills Workshop | -                                                           | 3,108                                    | -                                       | -                        | 3,108                                              |
| Quality Assurance                   | -                                                           | 14,000                                   | -                                       | -                        | 14,000                                             |
| Women in Science                    | <u>-</u>                                                    | <u>21,130</u>                            | <u>-</u>                                | <u>19,017</u>            | <u>2,113</u>                                       |
|                                     | <u>34,000</u>                                               | <u>134,272</u>                           | <u>-</u>                                | <u>91,257</u>            | <u>77,015</u>                                      |
| <b>SPECIAL INITIATIVES FUND</b>     | <u>1,250,000</u>                                            | <u>497,250</u>                           | <u>125,000</u>                          | <u>392,878</u>           | <u>1,229,372</u>                                   |
| <b>CARRY FORWARD</b>                | <u>17,409,842</u>                                           | <u>15,174,817</u>                        | <u>1,903,649</u>                        | <u>14,200,929</u>        | <u>16,480,081</u>                                  |

## Schedule 2 (Cont'd.)

SCIENCE COUNCIL OF BRITISH COLUMBIA  
SCHEDULE OF COMMITMENTS AND DISBURSEMENTS OF  
SCIENCE COUNCIL PROGRAM GRANTS  
YEAR ENDED MARCH 31, 1991

|                                     | Known<br>Outstanding<br>Commitments<br>Beginning<br>Of Year | Additional<br>Commitments<br>During Year | Commitment<br>Reductions<br>During Year | Disbursed<br>During Year | Known<br>Outstanding<br>Commitments<br>End Of Year |
|-------------------------------------|-------------------------------------------------------------|------------------------------------------|-----------------------------------------|--------------------------|----------------------------------------------------|
| CARRIED FORWARD                     | \$ 17,409,842                                               | \$ 15,174,817                            | \$ 1,903,649                            | \$ 14,200,929            | \$ 16,480,081                                      |
| SCIENCE AWARENESS PROGRAMS          |                                                             |                                          |                                         |                          |                                                    |
| Public Information                  | -                                                           | 139,495                                  | -                                       | 139,495                  | -                                                  |
| Science and Engineering Awards      | -                                                           | 59,724                                   | -                                       | 59,724                   | -                                                  |
| Travelling Science Show             | 1,000                                                       | -                                        | -                                       | 1,000                    | -                                                  |
| Public Awareness Fund               | 175,000                                                     | -                                        | -                                       | 90,588                   | 84,412                                             |
| Arts, Science and Technology Centre |                                                             |                                          |                                         |                          |                                                    |
| - Regional Science Fairs 1990       | 2,500                                                       | 1,129                                    | -                                       | 3,129                    | 500                                                |
| BCSTA/FISA Book Prize 1990          | 2,364                                                       | 592                                      | -                                       | 2,956                    | -                                                  |
| BCSTA/FISA Book Prize 1991          | -                                                           | 10,000                                   | -                                       | -                        | 10,000                                             |
| Science Education Initiatives       | -                                                           | 25,273                                   | -                                       | 5,273                    | 20,000                                             |
| Science School Fairs                | -                                                           | 40,000                                   | -                                       | 36,000                   | 4,000                                              |
| Stellar Motion                      | 5,000                                                       | -                                        | 5,000                                   | -                        | -                                                  |
|                                     | <u>185,864</u>                                              | <u>276,213</u>                           | <u>5,000</u>                            | <u>338,165</u>           | <u>118,912</u>                                     |
| OTHER EXPENSES                      |                                                             |                                          |                                         |                          |                                                    |
| Honoraria and Evaluation Expenses   | -                                                           | 58,490                                   | -                                       | 58,490                   | -                                                  |
| Program Audits                      | -                                                           | 39,073                                   | -                                       | 39,073                   | -                                                  |
| Program Evaluations                 | -                                                           | 35,000                                   | -                                       | 35,000                   | -                                                  |
| Program Promotions                  | -                                                           | 78,506                                   | -                                       | 78,506                   | -                                                  |
|                                     | <u>-</u>                                                    | <u>211,069</u>                           | <u>-</u>                                | <u>211,069</u>           | <u>-</u>                                           |
| CARRIED FORWARD                     | \$ 17,595,706                                               | \$ 15,662,009                            | \$ 1,908,649                            | \$ 14,750,163            | \$ 16,480,081                                      |

NOTES TO THE FINANCIAL STATEMENTS  
MARCH 31, 1991

1. ORGANIZATION

The Science Council of British Columbia was established in June 1978 under the Science Council of British Columbia Act. In 1989, the Science Council of British Columbia and the Secretariat on Science, Research and Development were amalgamated pursuant to the Science Council Act, Chapter 77, and continued as the Science Council of British Columbia ("Science Council").

The primary objective of Science Council is to encourage the development and application of advanced technology to support economic development in the Province including the implementation, administration and funding of programs and the organization and management of projects and initiatives.

2. ACCOUNTING POLICIES

**Basis of Accounting for Receipts, Expenditures and Appropriations**

Grant receipts are accounted for in the year the respective grant agreement becomes effective.

Full provision is made for all accrued liabilities except that outstanding Program commitments, which are conditional on receipt of satisfactory progress reports, are not recorded until disbursed.

Appropriations are comprised of grant receipts (net of transfers and disbursements), and any interest earned thereon, that are designated for expenditure under the programs specified in the grant agreement.

**Short-Term Investments**

Short-term investments are recorded at the lower of cost and market value.

**Fixed Assets**

Fixed assets are not capitalized and depreciated, but are recorded as expenditures in the period they are purchased.

### 3. PROGRAM APPROPRIATIONS

As at March 31, 1991 Program appropriations amounted to \$ 21,986,669 (1990 - \$19,657,389), of which \$ 16,598,993 (1990 - \$ 17,595,706) has been committed for expenditure for specifically identifiable projects and awards. The remaining balance of the Program appropriations amount is to be committed for expenditure throughout the remaining terms of the programs as per the funding contracts with the Province of British Columbia.

### 4. PROGRAM COMMITMENTS

During the year, the Science Council approved and committed to fund programs (as outlined in Schedule 2 ), totalling \$ 15,662,099 (1990 - \$ 16,841,298). At March 31, 1991, known outstanding commitments totalled \$ 16,598,993 (1990 - \$17,595,706).

#### Health Development Fund (HDF)

The HDF programs are designed to provide funding for health development projects as follows:

- a) special initiatives which lead to the commercial development of health technology products. This program (HDF - SCBC) is administered solely by Science Council.
- b) strategic initiatives in the field of health technology assessment. This program (HDF - JOINT) is administered jointly by Science Council and the British Columbia Health Research Foundation.

Subsequent to the year end, the HDF 1990/91 grant of \$ 1,472,549 (1990 - \$ 1,456,796) was received.

#### Market Assessment of Research and Technology (MART)

The MART Program is designed to encourage the analysis of market needs in the development of new science and technology based products.

During the years ending March 31, 1989 and 1990 the Science Council received MART funds under the terms of the Federal-Provincial Economic Regional Development Agreement - Science and Technology Sub-agreement. During the year ended March 31, 1991 the Science Council continued and funded the program in the amount of \$ 121,949 from its base Program grant budget.

## Special Initiatives Fund

The Special Initiatives Fund was a one-time only program designed to support science and technology related projects which do not qualify for funding under other existing programs administered by Science Council.

The Science Council has awarded, and committed for expenditure, \$ 1,622,250 under the Special Initiatives Fund. As at March 31, 1991 the Special Initiatives Fund had an appropriations balance in the amount of \$ 1,457,122 and known outstanding commitments in the amount of \$ 1,229,372.

## University Centres of Excellence

The Ministry of Environment has contracted with the Science Council to administer the University Centres of Excellence awards. This program is designed to support environmental research projects, including waste management and aquatic resource research projects, at Simon Fraser University, the University of British Columbia, and the University of Victoria.

During the year, the Science Council received, and appropriated, \$ 1,927,500 towards funding research projects under the program.

## 5. STRATEGIC PLANNING FOR APPLIED RESEARCH AND KNOWLEDGE (S.P.A.R.K.)

The objective of S.P.A.R.K. is to develop networks to identify opportunities for the application of research and development in various industries throughout the Province of British Columbia. S.P.A.R.K. is funded by grants from the Province of British Columbia, Government of Canada and fees derived from workshops and forums. During the year, the Science Council transferred \$ 500,000 (1990 - \$ 545,000) from Program and \$ 300,000 from the Special Initiatives Fund to S.P.A.R.K.

## 6. LEASE COMMITMENTS

The Science Council is committed to lease its office premises until March 31, 1998 at a base monthly rental of approximately \$ 17,400.